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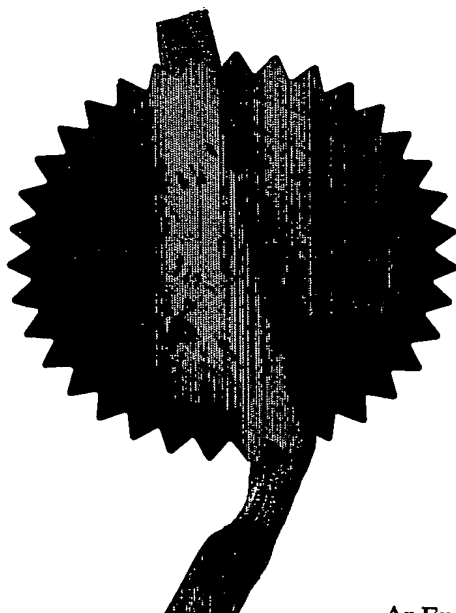
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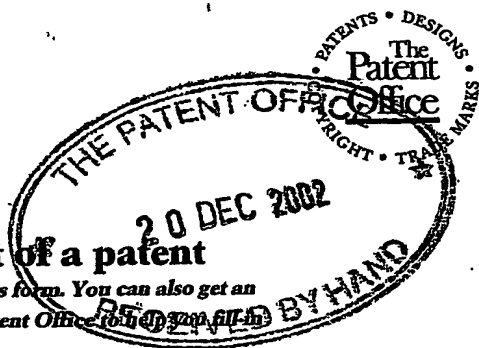


Signed

Dated 7 November 2003

Patents Form 1/77

Patents Act 1977
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24DEC02 E72879-2 002092
P01 7700 0.00-0229804.0

Request for grant of a patent

See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office (to be applied to this form)

The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference **PI-70203P1**

2. Patent application number
(The Patent Office will fill in this part)

20 DEC 2002

0229804.0

3. Full name, address and postcode of the or of each applicant (underline all surnames)

SYNGENTA PARTICIPATIONS AG
Intellectual Property Department
Schwarzwaldallee 215
4058 Basel, SWITZERLAND

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

0829 08350 01

4. Title of the invention

Avermectin B1 and Avermectin B1 monosaccharide derivatives having an alkoxyethyl substituent in the 4"- or 4'-position

5. Name of your agent (if you have one)

Michael James RICKS

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Syngenta Limited
Intellectual Property Department
Jealott's Hill Research Centre
PO Box 3538, BRACKNELL
Berkshire, RG42 6YA, UNITED KINGDOM

Patents ADP number (if you know it)

02282433003

08029541001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as an applicant, or

c) any named applicant is a corporate body.

See note (d))

Yes (b)

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description

54

Claim(s)

4

Abstract

1

DML

Drawing(s)

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

SYNGENTA PARTICIPATIONS AG

Signature

J A Bowdich

Date 20/12/02

Authorised Signatory

12. Name and daytime telephone number of person to contact in the United Kingdom

Joanna Carmen CHANDLER 01344 414079
Julie Anne BOWDICH 01344 414365

Warning

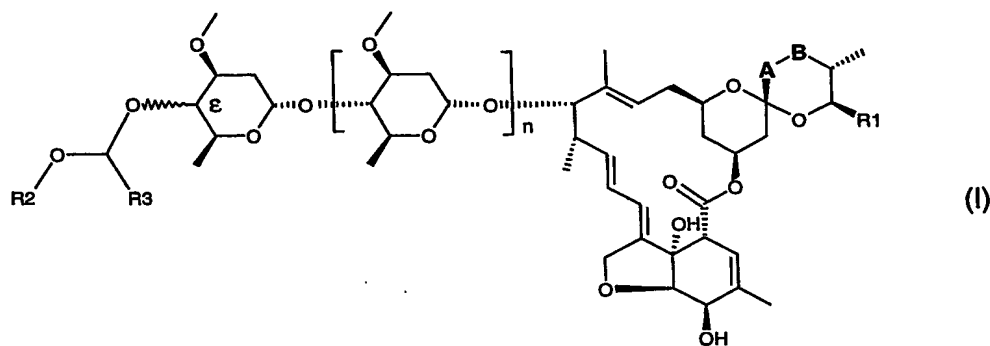
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Avermectin B1 and Avermectin B1 monosaccharide derivatives having an alkoxymethyl substituent in the 4"- or 4'-position

The invention relates to (1) a compound of formula



wherein

n is 0 or 1;

A-B is -CH=CH- or -CH₂-CH₂-;

R₁ is C₁-C₁₂-alkyl, C₃-C₈-cycloalkyl or C₂-C₁₂-alkenyl;

R₂ is C₁-C₁₂-alkyl, C₂-C₁₂-alkenyl, C₂-C₁₂-alkynyl; or C₁-C₁₂-alkyl, C₂-C₁₂-alkenyl or C₂-C₁₂-alkynyl, which are substituted with one to five substituents selected from the group consisting of OH, halogen, CN, -N₃, -NO₂, C₃-C₈-cycloalkyl which is optionally substituted with one to three C₁-C₆-alkyl-groups, C₃-C₈-cycloalkenyl which is optionally substituted with one to three C₁-C₆-alkyl-groups, norbornylenyl-, C₃-C₈-halocycloalkyl, C₁-C₁₂-alkoxy, C₁-C₆-alkoxy-C₁-C₆-alkoxy, C₃-C₈-cycloalkoxy, C₁-C₁₂-haloalkoxy, C₁-C₁₂-alkylthio, C₃-C₈-cycloalkylthio, C₁-C₁₂-haloalkylthio, C₁-C₁₂-alkylsulfinyl, C₃-C₈-cycloalkylsulfinyl, C₁-C₁₂-haloalkylsulfinyl, C₃-C₈-halocycloalkylsulfinyl, C₁-C₁₂-alkylsulfonyl, C₃-C₈-cycloalkylsulfonyl, C₁-C₁₂-haloalkylsulfonyl, C₃-C₈-halocycloalkylsulfonyl, -NR₄R₆, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, -P(=O)(OC₁-C₆-alkyl)₂, aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy; wherein the aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy groups are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, Halogen, CN, NO₂, C₁-C₁₂-alkyl, C₃-C₈-Cycloalkyl, C₁-C₁₂-Haloalkyl, C₁-C₁₂-alkoxy, C₁-C₁₂-Haloalkoxy, C₁-C₁₂-alkylthio, C₁-C₁₂-haloalkylthio, C₁-C₆-alkoxy-C₁-C₆-alkyl, C₂-C₈-alkenyl, C₂-C₈-alkynyl, Si(C₁-C₁₂-alkyl)₃, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, aryl, aryloxy, heterocyclyl and heterocyclyloxy; or

R_2 is aryl, heterocyclyl C_3 - C_8 -cycloalkyl, C_3 - C_8 -cycloalkenyl; or aryl, heterocyclyl C_3 - C_8 -Cycloalkyl or C_3 - C_8 -Cycloalkenyl, which are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, halogen, CN, NO_2 , C_1 - C_{12} -alkyl, C_3 - C_8 -cycloalkyl, C_1 - C_{12} -haloalkyl, C_1 - C_{12} -alkoxy, C_1 - C_{12} -haloalkoxy, C_1 - C_{12} -alkylthio, C_1 - C_{12} -haloalkylthio, C_1 - C_6 -alkoxy- C_1 - C_6 -alkyl, dimethylamino- C_1 - C_6 -alkoxy, C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, methylenedioxy, aryl, aryloxy, heterocyclyl and heterocyclyloxy;

R_3 is H, C_1 - C_{12} -alkyl or C_1 - C_{12} -alkyl which is substituted with one to five substituents selected from the group consisting of OH, halogen, CN, $-N_3$, $-NO_2$, C_3 - C_8 -Cycloalkyl which is optionally substituted with one to three C_1 - C_6 -alkyl groups, norbornylenyl-, C_3 - C_8 -Cycloalkenyl which is optionally substituted with one to three methyl groups; C_3 - C_8 -halocycloalkyl, C_1 - C_{12} -alkoxy, C_1 - C_6 -alkoxy- C_1 - C_6 -alkoxy, C_3 - C_8 -cycloalkoxy, C_1 - C_{12} -haloalkoxy, C_1 - C_{12} -alkylthio, C_3 - C_8 -cycloalkylthio, C_1 - C_{12} -haloalkylthio, C_1 - C_{12} -alkylsulfinyl, C_3 - C_8 -cycloalkylsulfinyl, C_1 - C_{12} -haloalkylsulfinyl, C_3 - C_8 -halocycloalkylsulfinyl, C_1 - C_{12} -alkylsulfonyl, C_3 - C_8 -cycloalkylsulfonyl, C_1 - C_{12} -haloalkylsulfonyl, C_3 - C_8 -halocycloalkylsulfonyl, $-NR_4R_6$, $-X-C(=Y)-R_4$, $-X-C(=Y)-Z-R_4$, $-P(=O)(OC_1-C_6-alkyl)_2$, aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy; wherein the aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy groups are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, Halogen, CN, NO_2 , C_1 - C_{12} -alkyl, C_3 - C_8 -Cycloalkyl, C_1 - C_{12} -Haloalkyl, C_1 - C_{12} -alkoxy, C_1 - C_{12} -Haloalkoxy, C_1 - C_{12} -alkylthio, C_1 - C_{12} -haloalkylthio, C_1 - C_6 -alkoxy- C_1 - C_6 -alkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, $Si(C_1-C_{12}-alkyl)_3$, $-X-C(=Y)-R_4$, $-X-C(=Y)-Z-R_4$, aryl, aryloxy, heterocyclyl and heterocyclyloxy; or

R_2 and R_3 together are a three- to seven-membered alkylene- or a four - to seven-membered alkenylenebridge, wherein one or two CH_2 -groups may independently of each other be substituted by a group $-C(=O)-$, $-C(=S)-$, O, S, $-NR_5$, $-OC(=O)-O$, $-OC(=O)S-$, $-OC(=O)N(R_5)-$, $-C(=O)O-$, $-C(=O)S$, $-C(=O)N(R_5)-$, $-N(R_5)C(=O)S-$, $-N(R_5)C(=O)N(R_5)-$, and wherein the alkylene or alkenylenebridge may be independently of each other substituted with one or two substituents selected from the group consisting of C_1 - C_4 -alkyl, C_1 - C_4 -alkoxy and C_1 - C_4 -halogenalkyl;

X is O, NR_5 or a bond;

Y is O or S;

Z is O, S or NR_5

R_4 is H, C_1 - C_{12} -alkyl which is optionally substituted with one to five substituents selected from the group consisting of halogen, hydroxy, C_1 - C_6 -alkoxy and CN; C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl, heterocyclyl- C_1 - C_{12} -alkyl; or aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl or heterocyclyl- C_1 - C_{12} -alkyl, which are – depending on the substitution possibilities – optionally substituted in the ring with one to five substituents selected from the group consisting of halogen, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkyl and C_1 - C_6 -haloalkoxy;

R_5 is H, C_1 - C_8 -alkyl, C_3 - C_8 -cycloalkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, benzyl or $-C(=O)$ - C_1 - C_{12} -alkyl;

R_6 is H, C_1 - C_{12} -alkyl which is optionally substituted with halogen, C_1 - C_6 -alkoxy, CN, C_2 - C_8 -alkenyl, C_2 - C_8 -haloalkenyl, C_2 - C_8 -alkinyl, C_1 - C_{12} -Haloalkenyl, $-X-C(=Y)-R_9$, $-X-C(=Y)-Z-R_9$, $-SO_2-R_9$, aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl, heterocyclyl- C_1 - C_{12} -alkyl; or aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl or heterocyclyl- C_1 - C_{12} -alkyl, which are – depending on the substitution possibilities – optionally substituted in the ring with one to five substituents selected from the group consisting of halogen, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkyl or C_1 - C_6 -haloalkoxy; or

R_4 and R_6 together are a three- to five membered alkylene bridge, wherein one of the methylene groups may be replaced by O, S or SO_2 ; and

R_9 is H, C_1 - C_{12} -alkyl which is optionally substituted with one to five substituents selected from the group consisting of halogen, hydroxy, C_1 - C_6 -alkoxy and CN; C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl, heterocyclyl- C_1 - C_{12} -alkyl; or aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl or heterocyclyl- C_1 - C_{12} -alkyl, which are – depending on the substitution possibilities – optionally substituted in the ring with one to five substituents selected from the group consisting of halogen, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkyl and C_1 - C_6 -haloalkoxy;

and, where applicable, to E/Z isomers, mixtures of E/Z isomers and/or tautomers, in each case in free form or in salt form;

to a process for the preparation of and to the use of those compounds and their isomers and tautomers; to starting materials for the preparation of the compounds of formula (I); to pesticidal compositions in which the active ingredient has been selected from the compounds of formula (I) and their tautomers; to a method for preparing the said compositions; and to a method of controlling pests using those compositions.

Hereinbefore and hereinafter, the bond marked by the symbol \sim in formulae (I), (II) and (IV) indicates that at the ϵ -position the S- as well as the R-isomer is meant.

Certain macrolide compounds are proposed for pest control in the literature. The biological properties of those known compounds are not entirely satisfactory, however, for which reason there is a need to provide further compounds having pesticidal properties, especially for the control of insects and members of the order Acarina. That problem is solved according to the invention by the provision of the present compounds of formula (I).

The compounds claimed according to the invention are derivatives of avermectin. Avermectins are known to the person skilled in the art. They are a group of structurally closely related pesticidally active compounds which are obtained by fermentation of a strain of the microorganism *Streptomyces avermitilis*. Derivatives of avermectins can be obtained via conventional chemical syntheses.

The avermectins obtainable from *Streptomyces avermitilis* are designated A1a, A1b, A2a, A2b, B1a, B1b, B2a and B2b. Compounds with the designation "A" have a methoxy radical in the 5-position; those compounds designated "B" have an OH group. The "a" series comprises compounds wherein the substituent R₁ (in position 25) is a sec-butyl radical; in the "b" series there is an isopropyl radical in the 25-position. The number 1 in the name of a compound indicates that atoms 22 and 23 are bonded by a double bond; the number 2 indicates that they are bonded by a single bond and carbon atom 23 carries an OH group. The above designations are retained in the description of the present invention in order in the case of the non-natural avermectin derivatives according to the invention to indicate the specific structural type corresponding to natural avermectin. There are claimed according to the invention derivatives of compounds of the B1 and B2 series, more especially mixtures of derivatives of avermectin B1a, B1b, B2a and B2b or the corresponding monosaccharides having, at the 4'- or 4"-position (ϵ -position), either the S- or the R-configuration.

Some of the compounds of formula (I) may be in the form of tautomers. Accordingly, any reference to the compounds of formula (I) hereinbefore and hereinafter is to be understood, where applicable, as including also corresponding tautomers, even if the latter are not specifically mentioned in every case.

The compounds of formula (I) and, where applicable, their tautomers can form salts, for example acid addition salts. These acid addition salts are formed, for example, with

strong inorganic acids, such as mineral acids, for example sulfuric acid, a phosphoric acid or a hydrohalic acid, with strong organic carboxylic acids, such as unsubstituted or substituted, for example halo-substituted, C₁-C₄alkanecarboxylic acids, for example acetic acid, unsaturated or saturated dicarboxylic acids, for example oxalic acid, malonic acid, maleic acid, fumaric acid or phthalic acid, hydroxycarboxylic acids, for example ascorbic acid, lactic acid, malic acid, tartaric acid or citric acid, or benzoic acid, or with organic sulfonic acids, such as unsubstituted or substituted, for example halo-substituted, C₁-C₄alkane- or aryl-sulfonic acids, for example methane- or p-toluene-sulfonic acid. Compounds of formula (I) that have at least one acidic group can furthermore form salts with bases. Suitable salts with bases are, for example, metal salts, such as alkali metal salts or alkaline earth metal salts, for example sodium, potassium or magnesium salts, or salts with ammonia or with an organic amine, such as morpholine, piperidine, pyrrolidine, a mono-, di- or tri-lower alkyl-amine, for example ethylamine, diethylamine, triethylamine or dimethylpropylamine, or a mono-, di- or trihydroxy-lower alkylamine, for example mono-, di- or tri-ethanolamine. Corresponding internal salts may also be formed where appropriate. The free form is preferred. Among the salts of the compounds of formula (I), the agrochemically advantageous salts are preferred. Hereinbefore and hereinafter, any reference to the free compounds of formula (I) or their salts is to be understood as including, where appropriate, also the corresponding salts or the free compounds of formula (I), respectively. The same applies to tautomers of compounds of formula (I) and salts thereof.

Unless defined otherwise, the general terms used hereinbefore and hereinafter have the meanings given below.

Unless defined otherwise, carbon-containing groups and compounds each contain from 1 up to and including 6, preferably from 1 up to and including 4, especially 1 or 2, carbon atoms.

Halogen - as a group *per se* and as a structural element of other groups and compounds, such as haloalkyl, haloalkoxy and haloalkylthio - is fluorine, chlorine, bromine or iodine, especially fluorine, chlorine or bromine, more especially fluorine or chlorine.

Alkyl - as a group *per se* and as a structural element of other groups and compounds, such as haloalkyl, alkoxy and alkylthio - is, in each case giving consideration to the number of carbon atoms contained in the group or compound in question, either straight-chained,

i.e. methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl or octyl, or branched, e.g. isopropyl, isobutyl, sec-butyl, tert-butyl, isopentyl, neopentyl or isohexyl.

Cycloalkyl - as a group *per se* and as a structural element of other groups and compounds, such as halocycloalkyl, cycloalkoxy and cycloalkylthio - is, in each case giving due consideration to the number of carbon atoms contained in the group or compound in question, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl or cyclooctyl.

Alkenyl - as a group *per se* and as a structural element of other groups and compounds - is, giving due consideration to the number of carbon atoms and conjugated or isolated double bonds contained in the group in question, either straight-chained, e.g. vinyl, allyl, 2-butenyl, 3-pentenyl, 1-hexenyl, 1-heptenyl, 1,3-hexadienyl or 1,3-octadienyl, or branched, e.g. isopropenyl, isobutenyl, isoprenyl, tert-pentenyl, isohexenyl, isoheptenyl or isooctenyl. Alkenyl groups having from 3 to 12, especially from 3 to 6, more especially 3 or 4, carbon atoms are preferred.

Alkynyl - as a group *per se* and as a structural element of other groups and compounds - is, in each case giving due consideration to the number of carbon atoms and conjugated or isolated double bonds contained in the group or compound in question, either straight-chained, e.g. ethynyl, propargyl, 2-butyne, 3-pentyne, 1-hexyne, 1-heptyne, 3-hexen-1-yne or 1,5-heptadien-3-yne, or branched, e.g. 3-methylbut-1-yne, 4-ethylpent-1-yne, 4-methylhex-2-yne or 2-methylhept-3-yne. Alkynyl groups having from 3 to 12, especially from 3 to 6, more especially 3 or 4, carbon atoms are preferred.

Alkylene and alkenylene are straight-chained or branched bridge members, especially $-\text{CH}_2\text{CH}_2\text{CH}_2-$, $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2-$, $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2-$, $-\text{CH}_2(\text{CH}_3)\text{CH}_2\text{CH}_2-$, $-\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}_2-$, $-\text{CH}_2\text{CH}=\text{CHCH}_2-$ or $-\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}_2-$.

Halo-substituted carbon-containing groups and compounds, such as alkyl, alkenyl, alkynyl, cycloalkyl, alkoxy or alkylthio substituted by halogen, may be partially halogenated or perhalogenated, it being possible in the case of polyhalogenation for the halogen substituents to be the same or different. Examples of haloalkyl - as a group *per se* and as a structural element of other groups and compounds, such as haloalkoxy and haloalkylthio - are methyl substituted from one to three times by fluorine, chlorine and/or bromine, such as CHF_2 or CF_3 ; ethyl substituted from one to five times by fluorine, chlorine and/or bromine, such as CH_2CF_3 , CF_2CF_3 , CF_2CCl_3 , CF_2CHCl_2 , CF_2CHF_2 , CF_2CFCl_2 , CF_2CHBr_2 , CF_2CHClF , CF_2CHBrF or CClFCHClF ; propyl or isopropyl substituted from one to seven times by

fluorine, chlorine and/or bromine, such as $\text{CH}_2\text{CHBrCH}_2\text{Br}$, $\text{CF}_2\text{CHFCH}_2\text{Br}$, $\text{CH}_2\text{CF}_2\text{CF}_3$ or $\text{CH}(\text{CF}_3)_2$; butyl or an isomer thereof substituted from one to nine times by fluorine, chlorine and/or bromine, such as $\text{CF}(\text{CF}_3)\text{CHFCH}_2\text{Br}$ or $\text{CH}_2(\text{CF}_2)_2\text{CF}_3$; pentyl or an isomer thereof substituted from one to eleven times by fluorine, chlorine and/or bromine, such as $\text{CF}(\text{CF}_3)(\text{CHF})_2\text{CF}_3$ or $\text{CH}_2(\text{CF}_2)_3\text{CF}_3$; and hexyl or an isomer thereof substituted from one to thirteen times by fluorine, chlorine and/or bromine, such as $(\text{CH}_2)_4\text{CHBrCH}_2\text{Br}$, $\text{CF}_2(\text{CHF})_4\text{CF}_3$, $\text{CH}_2(\text{CF}_2)_4\text{CF}_3$ or $\text{C}(\text{CF}_3)_2(\text{CHF})_2\text{CF}_3$.

Aryl is especially phenyl, naphthyl, anthracenyl or perylenyl, preferably phenyl.

Heterocyclyl is especially pyridyl, pyrimidyl, s-triazinyl, 1,2,4-triazinyl, thienyl, furyl, tetrahydrofuranyl, pyranyl, tetrahydropyranyl, pyrrolyl, pyrazolyl, imidazolyl, thiazolyl, triazolyl, tetrazolyl, oxazolyl, thiadiazolyl, oxadiazolyl, benzothienyl, quinolinyl, quinoxalinyl, benzofuranyl, benzimidazolyl, benzopyrrolyl, benzothiazolyl, indolyl, coumarinyl or indazolyl, which are preferably bonded *via* a carbon atom; preference is given to thienyl, thiazolyl, benzofuranyl, benzothiazolyl, furyl, tetrahydropyranyl and indolyl; especially pyridyl or thiazolyl.

Within the scope of the present invention, preference is given to

- (2) a compound according to group (1) of formula (I) in the free form;
- (3) a compound according to anyone of groups (1) or (2) of formula (I) wherein R_3 is H;
- (4) a compound according to anyone of groups (1) or (2) of formula (I) wherein R_3 is $\text{C}_1\text{-C}_8\text{-alkyl}$;
- (5) a compound according to anyone of groups (1) to (4) of formula (I) wherein R_2 is $\text{C}_1\text{-C}_8\text{-alkyl}$, especially methyl;
- (6) a compound according to anyone of groups (1) to (5) of formula (I) wherein R_2 is $\text{C}_3\text{-C}_8\text{-alkyl}$, especially propyl or isopropyl;
- (7) a compound according to anyone of groups (1) to (5) of formula (I) wherein R_2 is a branched $\text{C}_3\text{-C}_8\text{-alkyl}$, especially isobutyl, sec-butyl or tert-butyl;
- (8) a compound according to one of groups (1) to (4) of formula (I) wherein R_2 is $\text{C}_1\text{-C}_8\text{-alkoxy-C}_1\text{-C}_8\text{-alkyl}$;
- (9) a compound according to anyone of groups (1) to (4) of formula (I) wherein R_2 is

C₁-C₈-alkyl which is substituted with one to five substituents selected from the group consisting of OH, halogen, CN, -N₃, -NO₂, C₃-C₈-cycloalkyl which is optionally substituted with one to three C₁-C₆-alkyl groups, norbornylenyl-, C₃-C₈-Cycloalkenyl which is optionally substituted with one to three methyl groups; C₃-C₈-halocycloalkyl, C₃-C₈-cycloalkoxy, C₁-C₁₂-haloalkoxy, C₁-C₁₂-alkylthio, aryl, heterocyclyl, arylthio or heterocyclyloxy; wherein the aryl, heterocyclyl, arylthio and heterocyclyloxy groups are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, Halogen, CN, NO₂, C₁-C₁₂-alkyl, C₃-C₈-cycloalkyl, C₁-C₁₂-haloalkyl, C₁-C₁₂-alkoxy, C₁-C₁₂-haloalkoxy, C₁-C₁₂-alkylthio, C₁-C₁₂-haloalkylthio, C₁-C₆-alkoxy-C₁-C₆-alkyl, C₂-C₈-alkenyl, C₂-C₈-alkinyl, Si(C₁-C₁₂-alkyl)₃, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, aryl, aryloxy, heterocyclyl and heterocyclyloxy; more especially wherein

R₂ is C₁-C₈-alkyl which is substituted with one substituent selected from the group consisting of C₃-C₈-cycloalkylthio, C₁-C₁₂-haloalkylthio, C₁-C₁₂-alkylsulfinyl, C₃-C₈-cycloalkylsulfinyl, C₁-C₁₂-haloalkylsulfinyl, C₃-C₈-halocycloalkylsulfinyl, C₁-C₁₂-alkylsulfonyl, C₃-C₈-cycloalkylsulfonyl, C₁-C₁₂-haloalkylsulfonyl, C₃-C₈-halocycloalkylsulfonyl, -NR₄R₆, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, -P(=O)(OC₁-C₆-alkyl)₂;

(8) a compound according to anyone of groups (1) to (4) of formula (I) wherein R₂ is C₁-C₄-alkyl which is substituted with one or two substituents selected from the group consisting of OH, halogen, CN, -N₃, -NO₂, C₁-C₁₂-alkylsulfinyl, C₁-C₁₂-alkylsulfonyl, C₁-C₁₂-haloalkylsulfonyl, -NR₄R₆, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, aryl or heterocyclyl, wherein the aryl and heterocyclyl groups are optionally – depending on the substitution possibilities on the ring – substituted with one or two substituents selected from the group consisting of OH, Halogen, CN, NO₂, C₁-C₄-alkyl, -C₈-cycloalkyl, C₁-C₁₂-haloalkyl, C₁-C₁₂-alkoxy, C₁-C₁₂-haloalkoxy, C₁-C₁₂-alkylthio, C₁-C₁₂-haloalkylthio, C₁-C₆-alkoxy-C₁-C₆-alkyl, C₂-C₈-alkenyl, C₂-C₈-alkinyl, Si(C₁-C₁₂-alkyl)₃, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, aryl, aryloxy, heterocyclyl and heterocyclyloxy;

(9) a compound according to anyone of groups (1) to (8) of formula (I) wherein R₁ is isopropyl or sec-butyl, preferably wherein a mixture of the isopropyl and the sec-butyl derivative is present;

(10) a compound according to anyone of groups (1) to (8) of formula (I) wherein R₁ is cyclohexyl;

(11) a compound according to anyone of groups (1) to (10) of the formula (I), in which

n is 1;

(13) a compound according to anyone of groups (1) to (10) of the formula (I), in which n is 0;

(14) a compound according to anyone of groups (1) to (13) of the formula (I), in which A-B is $-\text{CH}_2\text{-CH}_2-$;

(15) a compound according to anyone of groups (1) to (13) of the formula (I), in which A-B is $-\text{CH=CH}-$ bond.

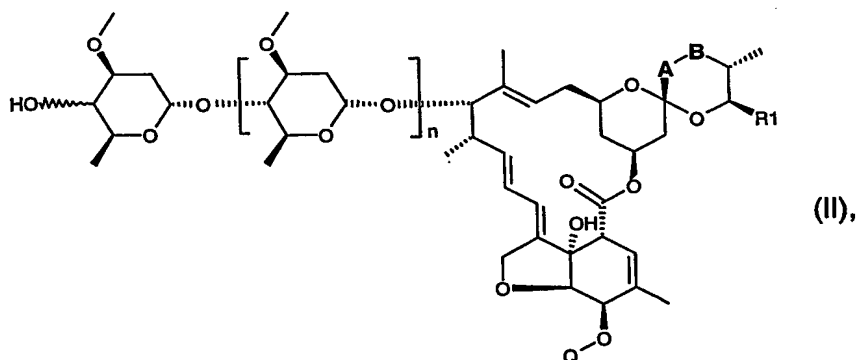
(16) a compound according to anyone of groups (1) to (15) of the formula (I) having the R-configuration in the ϵ -position;

(17) a compound according to anyone of groups (1) to (15) of the formula (I) having the S-configuration in the ϵ -position.

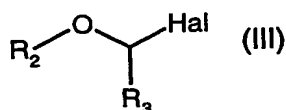
Especially preferred are the compounds of the tables.

The invention further relates to a process for the preparation of the compounds of formula (I) as defined above under (1) and, where applicable, tautomers thereof, which comprises

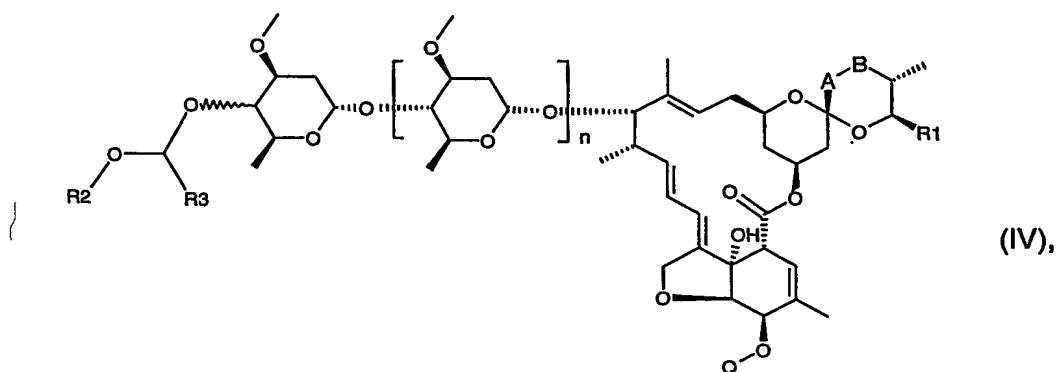
(A) reacting a compound of formula



wherein R_1 , n and the grouping A-B are as defined above under (1) for formula (I) and Q is a protecting group, and which is known or can be prepared by methods known *per se*, with a compound of formula



wherein R_2 and R_3 are as defined above for formula (I) and Hal is a halogen atom, preferably bromine or iodine, and which is known or can be prepared by methods known *per se*, to form a compound of formula



wherein Q, R_1 , R_2 and R_3 are as defined for formula (II); and

(B) removing the protecting group Q of the compound of formula (IV) so obtained.

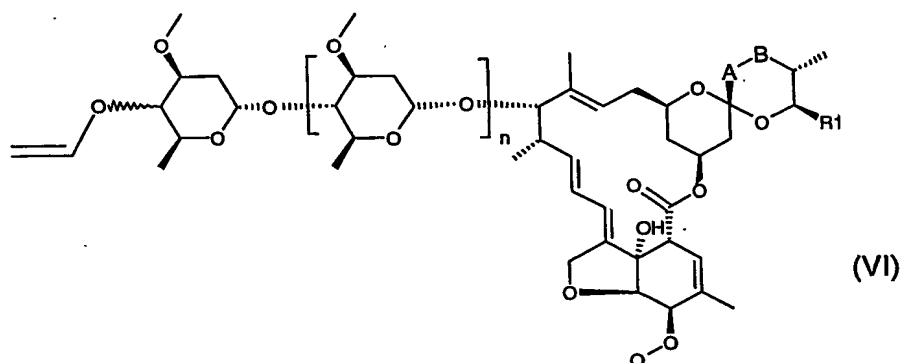
The invention further relates to a process for the preparation of the compounds of formula (I) as defined above under (1), wherein R_3 is $-\text{CH}_2\text{R}_7$

(C) reacting a compound of formula (II) with a compound of formula



wherein R_2 is as defined for formula (I) and R_7 is H, $\text{C}_1\text{-C}_{11}$ -alkyl or $\text{C}_1\text{-C}_{11}$ -halogenalkyl; or R_2 and R_7 together are a three- to six-membered alkylen- or a four- to six-membered alkenylen, wherein one CH_2 -group is optionally replaced by a group selected from $\text{C}(=\text{O})$, $\text{-C}=\text{S}$, O, S, -NR_5 , $\text{-OC}(=\text{O})\text{O-}$, $\text{-OC}(=\text{O})\text{S-}$, $\text{-OC}(=\text{O})\text{NR}_5\text{-}$, $\text{-C}(=\text{O})\text{O-}$, $\text{-C}(=\text{O})\text{S-}$, $\text{-C}(=\text{O})\text{NR}_5\text{-}$, $\text{-NR}_5\text{C}(=\text{O})\text{S-}$ and $\text{-NR}_5\text{CONR}_5\text{-}$, and wherein alkenylen is optionally substituted with one or two substituents which are selected from the group consisting of $\text{C}_1\text{-C}_4$ -alkyl, $\text{C}_1\text{-C}_4$ -alkoxy and $\text{C}_1\text{-C}_4$ -halogenalkyl, and wherein the said substituents are independent of each other;

(D) In particular, compounds of the formula (I), wherein R_3 is CH_2Hal and Hal is a halogen can be prepared by deprotection of compounds of the formula (IV), wherein R_3 is CH_2Hal . The latter can be prepared by haloacetalization of compounds of the formula



Compounds of the formula (VI) can be prepared by vinylation of compounds of the formula (II).

Compounds of the formula (IV), wherein R is CH_2Hal can in particular be used to prepare compounds of the formula (IV), wherein R_3 is CH_2R_8 , wherein R_8 is CN , NR_4R_6 , $-\text{NHC}(=\text{O})\text{R}_4$, NHNH_2 , NHNH R_4 , $\text{N R}_4\text{N R}_4\text{R}_6$, OR_4 or SR_4 .

Compounds of the formulae (IV) and (IVb) are preferred compounds for the preparation of compounds of the formula (I).

Furthermore compounds of formula (I) bearing a functional group in its free or protected form can be used as starting materials for the preparation of further compounds of formula (I). For such manipulations methods known to the person skilled in the art can be applied.

For example a compound of formula (I) wherein R_2 is $\text{CH}_2\text{CH}_2\text{OCOCH}_3$ can be converted to a compound of formula (I) wherein R_2 is $\text{CH}_2\text{CH}_2\text{OH}$. Further standard reactions can deliver compounds of formula (I) wherein R_2 is $\text{CH}_2\text{CH}_2\text{OCH}_2\text{O-Alkyl}$, $\text{CH}_2\text{CH}_2\text{OCOR}_4$, $\text{CH}_2\text{CH}_2\text{OCOZR}_4$ and $\text{CH}_2\text{CH}_2\text{N}_3$. A compound of formula (I) wherein R_2 is $\text{CH}_2\text{CH}_2\text{N}_3$ can be converted to a compound of formula (I) wherein R_2 is $\text{CH}_2\text{CH}_2\text{NH}_2$. Treatment of such a compound of formula (I) with Hal-COR_4 or Hal-COZR_4 gives compounds of formula (I) wherein R_2 is $\text{CH}_2\text{CH}_2\text{NHCOR}_4$ and $\text{CH}_2\text{CH}_2\text{NHCOZR}_4$.

The reactions described hereinbefore and hereinafter are carried out in a manner known *per se*, for example in the absence or, customarily, in the presence of a suitable solvent or diluent or of a mixture thereof, the reactions being carried out, as required, with cooling, at room temperature or with heating, for example in a temperature range of approximately from -80°C to the boiling temperature of the reaction medium, preferably from approximately 0°C to approximately $+150^\circ\text{C}$, and, if necessary, in a closed vessel, under

pressure, under an inert gas atmosphere and/or under anhydrous conditions. Especially advantageous reaction conditions can be found in the Examples.

The reaction time is not critical; a reaction time of from approximately 0.1 to approximately 72 hours, especially from approximately 0.5 to approximately 24 hours, is preferred.

The product is isolated by customary methods, for example by means of filtration, crystallisation, distillation or chromatography, or any suitable combination of such methods.

The starting materials mentioned hereinbefore and hereinafter that are used for the preparation of the compounds of formula (I) and, where applicable, their tautomers are known or can be prepared by methods known *per se*, e.g. as indicated below.

Process variant (A):

Examples of solvents and diluents include: aromatic, aliphatic and alicyclic hydrocarbons and halogenated hydrocarbons, such as benzene, toluene, xylene, mesitylene, tetralin, chlorobenzene, dichlorobenzene, bromobenzene, petroleum ether, hexane, cyclohexane, dichloromethane, trichloromethane, tetrachloromethane, dichloroethane, trichloroethene or tetrachloroethene; ethers, such as diethyl ether, dipropyl ether, diisopropyl ether, dibutyl ether, tert-butyl methyl ether, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol dimethyl ether, dimethoxydiethyl ether, tetrahydrofuran or dioxane; esters of carboxylic acids, such as ethyl acetate; amides, such as dimethylformamide, dimethylacetamide or 1-methyl-2-pyrrolidinones; nitriles, such as acetonitrile; sulfoxides, such as dimethyl sulfoxide; or mixtures of the mentioned solvents. Preference is given to amides, such as dimethylformamide and dimethylacetamide, especially dimethylacetamide.

Protecting groups Q in the compounds of formulae (II) and (IV) include: alkyl ether radicals, such as methoxymethyl, methylthiomethyl, tert-butylthiomethyl, benzyloxymethyl, p-methoxybenzyl, 2-methoxyethoxymethyl, 2,2,2-trichloroethoxymethyl, 2-(trimethylsilyl)ethoxymethyl, tetrahydropyranyl, tetrahydrofuranyl, 1-ethoxyethyl, 1-(2-chloroethoxy)ethyl, 1-methyl-1-methoxyethyl, 1-methyl-1-benzyloxyethyl, trichloroethyl, 2-trimethylsilylethyl, tert-butyl, allyl, p-methoxyphenyl, 2,4-dinitrophenyl, benzyl, p-methoxybenzyl, o-nitrobenzyl, p-nitrobenzyl, triphenylmethyl; trialkylsilyl radicals, such as trimethylsilyl, triethylsilyl, dimethyl-tert-butylsilyl, dimethyl-isopropylsilyl, dimethyl-1,1,2-trimethylpropylsilyl, diethyl-isopropylsilyl, dimethyl-tert-hexylsilyl, but also phenyl-tert-alkylsilyl groups,

such as diphenyl-tert-butylsilyl; esters, such as formates, acetates, chloroacetates, dichloroacetates, trichloroacetates, trifluoroacetates, methoxyacetates, phenoxyacetates, pivaloates, benzoates; alkyl carbonates, such as methyl-, 9-fluorenylmethyl-, ethyl-, 2,2,2-trichloroethyl-, 2-(trimethylsilyl)ethyl-, vinyl-, allyl-, benzyl-, p-methoxybenzyl-, o-nitrobenzyl-, p-nitrobenzyl-, but also p-nitrophenyl-carbonate.

Preference is given to trialkylsilyl radicals, such as trimethylsilyl, triethylsilyl, dimethyl-tert-butylsilyl, diphenyl-tert-butylsilyl, esters, such as methoxyacetates and phenoxyacetates, and carbonates, such as 9-fluorenylmethylcarbonates and allylcarbonates. Dimethyl-tert-butylsilyl ether is especially preferred.

The reactions are advantageously carried out in a temperature range of from approximately -70°C to 50°C, preferably at from -10°C to 25°C.

Especially preferred conditions for the reaction are described in Example P.1 and P2.

Process variant (B):

Examples of solvents and diluents are the same as those mentioned under Process variant A. In addition, alcohols, such as methanol, ethanol or 2-propanol, and water are suitable.

The reactions are advantageously carried out in a temperature range of approximately from -70°C to 100°C, preferably at from -10°C to 25°C.

There are suitable for the removal of the protecting group Lewis acids, such as hydrochloric acid, methanesulfonic acid, $\text{BF}_3 \cdot \text{OEt}_2$, HF in pyridine, $\text{Zn}(\text{BF}_4)_2 \cdot \text{H}_2\text{O}$, p-toluenesulfonic acid, AlCl_3 , HgCl_2 ; ammonium fluoride, such as tetrabutylammonium fluoride; bases, such as ammonia, trialkylamine or heterocyclic bases; hydrogenolysis with a catalyst, such as palladium-on-carbon; reducing agents, such as sodium borohydride or tributyltin hydride with a catalyst, such as $\text{Pd}(\text{PPh}_3)_4$, or also zinc with acetic acid.

Preference is given to acids, such as methanesulfonic acid or HF in pyridine; sodium borohydride with $\text{Pd}(0)$; bases, such as ammonia, triethylamine or pyridine; especially acids, such as HF in pyridine or methanesulfonic acid.

Especially preferred conditions for the reaction are described in Example P.1, P2, P3, P4 and P5.

Process variant (C):

Examples of solvents and diluents are the same as those mentioned under Process variant A.

The reactions are advantageously carried out in a temperature range of approximately from -70°C to 100°C, preferably at from -10°C to 55°C.

The reaction is preferably performed in the presence of an acid or Lewis acid. Typical acids and Lewis acids are especially mineral acids, e.g. sulfuric acid, a phosphoric acid or a hydrohalic acid, especially hydrochloric acid, methanesulfonic acid, e.g. halo-substituted, C₁-C₄alkanecarboxylic acid, for example acetic acid, a saturated or unsaturated dicarboxylic acid, for example oxalic acid, malonic acid, maleic acid, fumaric acid or phthalic acid, a hydroxycarboxylic acid, for example ascorbic acid, lactic acid, malic acid, tartaric acid or citric acid, or benzoic acid, or BF₃*OEt₂.

Process variant (D):

Examples of solvents and diluents are the same as those mentioned under Process variant A.

The reactions are advantageously carried out in a temperature range of approximately from -70°C to 150°C, preferably at from -20°C to 120°C.

Preferred reaction conditions for the haloacetalization and the vinylation are as such as described in the literature known to a person skilled in the art.

The compounds of formula (I) may be in the form of one of the possible isomers or in the form of a mixture thereof, in the form of pure isomers or in the form of an isomeric mixture, i.e. in the form of a racemic mixture; the invention relates both to the pure isomers and to the racemic mixtures and is to be interpreted accordingly hereinbefore and hereinafter, even if stereochemical details are not mentioned specifically in every case.

The racemates can be resolved into the optical antipodes by known methods, for example by recrystallisation from an optically active solvent, by chromatography on chiral adsorbents, for example high pressure liquid chromatography (HPLC) on acetylcellulose, with the aid of suitable microorganisms, by cleavage with specific, immobilised enzymes, or *via* the formation of inclusion compounds, for example using chiral crown ethers, only one isomer being complexed.

Apart from by separation of corresponding mixtures of isomers, pure optical isomers can be obtained according to the invention also by generally known methods of enantio-selective synthesis, for example by carrying out the process according to the invention using starting materials having correspondingly suitable stereochemistry.

In each case it is advantageous to isolate or synthesise the biologically more active isomer, where the individual components have different biological activity.

The compounds of formula (I) may also be obtained in the form of their hydrates and/or may include other solvents, for example solvents which may have been used for the crystallisation of compounds in solid form.

The invention relates to all those embodiments of the process according to which a compound obtainable as starting material or intermediate at any stage of the process is used as starting material and some or all of the remaining steps are carried out or a starting material is used in the form of a derivative or salt and/or its racemates or antipodes or, especially, is formed under the reaction conditions.

In the processes of the present invention it is preferable to use those starting materials and intermediates which result in the compounds of formula (I) that are especially preferred.

The invention relates especially to the preparation processes described in the Examples.

The invention further relates to the compounds of formula (IV) and, where applicable, E/Z isomers, mixtures of E/Z isomers and/or tautomers, in each case in free form or in salt form.

In the area of pest control, the compounds of formula (I) according to the invention are active ingredients exhibiting valuable preventive and/or curative activity with a very advantageous biocidal spectrum and a very broad spectrum, even at low rates of concentration, while being well tolerated by warm-blooded animals, fish and plants. They are, surprisingly, equally suitable for controlling both plant pests and ecto- and endo-parasites in humans and more especially in productive livestock, domestic animals and pets. They are effective against all or individual development stages of normally sensitive animal pests, but also of resistant animal pests, such as insects and representatives of the order Acarina, nematodes, cestodes and trematodes, while at the same time protecting useful organisms. The

insecticidal or acaricidal activity of the active ingredients according to the invention may manifest itself directly, i.e. in the mortality of the pests, which occurs immediately or only after some time, for example during moulting, or indirectly, for example in reduced oviposition and/or hatching rate, good activity corresponding to a mortality of at least 50 to 60 %.

The action of the compounds according to the invention and the compositions comprising them against animal pests can be significantly broadened and adapted to the given circumstances by the addition of other insecticides, acaricides or nematicides. Suitable additives include, for example, representatives of the following classes of active ingredient: organophosphorus compounds, nitrophenols and derivatives, formamidines, ureas, carbamates, pyrethroids, chlorinated hydrocarbons, neonicotinoids and *Bacillus thuringiensis* preparations.

Examples of especially suitable mixing partners include: azamethiphos; chlorfenvinphos; cypermethrin, cypermethrin high-cis; cyromazine; diafenthiuron; diazinon; dichlorvos; dicrotophos; dicyclanil; fenoxycarb; fluazuron; furathiocarb; isazofos; iodfenphos; kinoprene; lufenuron; methacriphos; methidathion; monocrotophos; phosphamidon; profenofos; diofenolan; a compound obtainable from the *Bacillus thuringiensis* strain GC91 or from strain NCTC11821; pymetrozine; bromopropylate; methoprene; disulfoton; quinalphos; taufluvalinate; thiocyclam; thiometon; aldicarb; azinphos-methyl; benfuracarb; bifenthrin; buprofezin; carbofuran; dibutylaminothio; cartap; chlorfluazuron; chlorpyrifos; cyfluthrin; lambda-cyhalothrin; alpha-cypermethrin; zeta-cypermethrin; deltamethrin; diflubenzuron; endosulfan; ethiofencarb; fenitrothion; fenobucarb; fenvalerate; formothion; methiocarb; heptenophos; imidacloprid; isoprocarb; methamidophos; methomyl; mevinphos; parathion; parathion-methyl; phosalone; pirimicarb; propoxur; teflubenzuron; terbufos; triazamate; fenobucarb; tebufenozide; fipronil; beta-cyfluthrin; silafluofen; fenpyroximate; pyridaben; fenazaquin; pyriproxyfen; pyrimidifen; nitenpyram; acetamiprid; emamectin; emamectinbenzoate; spinosad; a plant extract that is active against insects; a preparation that comprises nematodes and is active against insects; a preparation obtainable from *Bacillus subtilis*; a preparation that comprises fungi and is active against insects; a preparation that comprises viruses and is active against insects; chlorfenapyr; acephate; acrinathrin; alanycarb; alphamethrin; amitraz; AZ 60541; azinphos A; azinphos M; azocyclotin; bendiocarb; bensultap; beta-cyfluthrin; BPMC; brofenprox; bromophos A; bufencarb; butocarboxin; butylpyridaben; cadusafos; carbaryl; carbophenothion; chloethocarb; chlorethoxyfos; chlor-mephos; cis-resmethrin; clopythrin; clofentezine; cyanophos; cycloprothrin; cyhexatin;

demeton M; demeton S; demeton-S-methyl; dichlofenthion; dicliphos; diethion; dimethoate; dimethylvinphos; dioxathion; edifenphos; esfenvalerate; ethion; ethofenprox; ethoprophos; etrimphos; fenamiphos; fenbutatin oxide; fenothiocarb; fenpropathrin; fenpyrad; fenthion; fluazinam; flucycloxuron; flucythrinate; flufenoxuron; flufenprox; fonophos; fosthiazate; fubfenprox; HCH; hexaflumuron; hexythiazox; IKI-220; iprobenfos; isofenphos; isoxathion; ivermectin; malathion; mecarbam; mesulfenphos; metaldehyde; metolcarb; milbemectin; moxidectin; naled; NC 184; omethoate; oxamyl; oxydemethon M; oxydeprofos; permethrin; phenthoate; phorate; phosmet; phoxim; pirimiphos M; pirimiphos E; promecarb; propaphos; prothiofos; prothoate; pyrachlophos; pyradaphenthion; pyresmethrin; pyrethrum; tebufenozide; salithion; sebufos; sulfotep; sulprofos; tebufenpyrad; tebupirimphos; tefluthrin; temephos; terbam; tetrachlorvinphos; thiacloprid; thiafenox; thiodicarb; thiofanox; thionazin; thuringiensin; tralomethrin; triarthene; triazophos; triazuron; trichlorfon; triflumuron; trimethacarb; vamidothion; xylylcarb; YI 5301/5302; zetamethrin; DPX-MP062 — indoxacarb; methoxyfenozide; bifenazate; XMC (3,5-xylyl methylcarbamate); or the fungus pathogen *Metarhizium anisopliae*; most especially fipronil, thiamethoxam, or lambda-cyhalothrin.

The said animal pests include, for example, those mentioned in European Patent Application EP-A-736 252, page 5, line 55, to page 6, line 55. The pests mentioned therein are therefore included by reference in the subject matter of the present invention.

It is also possible to control pests of the class Nematoda using the compounds according to the invention. Such pests include, for example,

root knot nematodes, cyst-forming nematodes and also stem and leaf nematodes; especially of *Heterodera* spp., e.g. *Heterodera schachtii*, *Heterodera avenae* and *Heterodera trifolii*; *Globodera* spp., e.g. *Globodera rostochiensis*; *Meloidogyne* spp., e.g. *Meloidogyne incognita* and *Meloidogyne javanica*; *Radopholus* spp., e.g. *Radopholus similis*; *Pratylenchus*, e.g. *Pratylenchus neglectans* and *Pratylenchus penetrans*; *Tylenchulus*, e.g. *Tylenchulus semipenetrans*; *Longidorus*, *Trichodorus*, *Xiphinema*, *Ditylenchus*, *Aphelenchoides* and *Anguina*; especially *Meloidogyne*, e.g. *Meloidogyne incognita*, and *Heterodera*, e.g. *Heterodera glycines*.

An especially important aspect of the present invention is the use of the compounds of formula (I) according to the invention in the protection of plants against parasitic feeding pests.

The compounds according to the invention can be used to control, i.e. to inhibit or destroy, pests of the mentioned type occurring on plants, especially on useful plants and ornamentals in agriculture, in horticulture and in forestry, or on parts of such plants, such as the fruits, blossoms, leaves, stems, tubers or roots, while in some cases plant parts that grow later are still protected against those pests.

Target crops include especially cereals, such as wheat, barley, rye, oats, rice, maize and sorghum; beet, such as sugar beet and fodder beet; fruit, e.g. pomes, stone fruit and soft fruit, such as apples, pears, plums, peaches, almonds, cherries and berries, e.g. strawberries, raspberries and blackberries; leguminous plants, such as beans, lentils, peas and soybeans; oil plants, such as rape, mustard, poppy, olives, sunflowers, coconut, castor oil, cocoa and groundnuts; cucurbitaceae, such as marrows, cucumbers and melons; fibre plants, such as cotton, flax, hemp and jute; citrus fruits, such as oranges, lemons, grapefruit and mandarins; vegetables, such as spinach, lettuce, asparagus, cabbages, carrots, onions, tomatoes, potatoes and paprika; lauraceae, such as avocado, cinnamon and camphor; and tobacco, nuts, coffee, aubergines, sugar cane, tea, pepper, vines, hops, bananas, natural rubber plants and ornamentals.

Further areas of use of the compounds according to the invention are the protection of stored goods and storerooms and the protection of raw materials, and also in the hygiene sector, especially the protection of domestic animals and productive livestock against pests of the mentioned type, more especially the protection of domestic animals, especially cats and dogs, from infestation by fleas, ticks and nematodes.

The invention therefore relates also to pesticidal compositions, such as emulsifiable concentrates, suspension concentrates, directly sprayable or dilutable solutions, spreadable pastes, dilute emulsions, wettable powders, soluble powders, dispersible powders, wettable powders, dusts, granules and encapsulations of polymer substances, that comprise at least one of the compounds according to the invention, the choice of formulation being made in accordance with the intended objectives and the prevailing circumstances.

The active ingredient is used in those compositions in pure form, a solid active ingredient, for example, in a specific particle size, or preferably together with at least one of the adjuvants customary in formulation technology, such as extenders, e.g. solvents or solid carriers, or surface-active compounds (surfactants). In the area of parasite control in

humans, domestic animals, productive livestock and pets it will be self-evident that only physiologically tolerable additives are used.

As formulation adjuvants there are used, for example, solid carriers, solvents, stabilisers, "slow release" adjuvants, colourings and optionally surface-active substances (surfactants). Suitable carriers and adjuvants include all substances customarily used. As adjuvants, such as solvents, solid carriers, surface-active compounds, non-ionic surfactants, cationic surfactants, anionic surfactants and further adjuvants in the compositions used according to the invention, there come into consideration, for example, those described in EP-A-736 252, page 7, line 51 to page 8, line 39.

The compositions for use in crop protection and in humans, domestic animals and productive livestock generally comprise from 0.1 to 99 %, especially from 0.1 to 95 %, of active ingredient and from 1 to 99.9 %, especially from 5 to 99.9 %, of at least one solid or liquid adjuvant, the composition generally including from 0 to 25 %, especially from 0.1 to 20 %, of surfactants (% = % by weight in each case). Whereas commercial products will preferably be formulated as concentrates, the end user will normally employ dilute formulations having considerably lower concentrations of active ingredient.

Preferred crop protection products have especially the following compositions (% = percent by weight):

Emulsifiable concentrates:

active ingredient:	1 to 90%, preferably 5 to 20%
surfactant:	1 to 30%, preferably 10 to 20%
solvent:	5 to 98%, preferably 70 to 85%

Dusts:

active ingredient:	0.1 to 10%, preferably 0.1 to 1%
solid carrier:	99.9 to 90%, preferably 99.9 to 99%

Suspension concentrates:

active ingredient:	5 to 75%, preferably 10 to 50%
water:	94 to 24%, preferably 88 to 30%
surfactant:	1 to 40%, preferably 2 to 30%

Wettable powders:

active ingredient:	0.5 to 90%, preferably 1 to 80%
surfactant:	0.5 to 20%, preferably 1 to 15%
solid carrier:	5 to 99%, preferably 15 to 98%

Granules:

active ingredient:	0.5 to 30%, preferably 3 to 15%
solid carrier:	99.5 to 70%, preferably 97 to 85%

The compositions according to the invention may also comprise further solid or liquid adjuvants, such as stabilisers, e.g. vegetable oils or epoxidised vegetable oils (e.g. epoxidised coconut oil, rapeseed oil or soybean oil), antifoams, e.g. silicone oil, preservatives, viscosity regulators, binders and/or tackifiers as well as fertilisers or other active ingredients for obtaining special effects, e.g. acaricides, bactericides, fungicides, nematocides, molluscicides or selective herbicides.

The crop protection products according to the invention are prepared in known manner, in the absence of adjuvants, e.g. by grinding, sieving and/or compressing a solid active ingredient or mixture of active ingredients, for example to a certain particle size, and in the presence of at least one adjuvant, for example by intimately mixing and/or grinding the active ingredient or mixture of active ingredients with the adjuvant(s). The invention relates likewise to those processes for the preparation of the compositions according to the invention and to the use of the compounds of formula (I) in the preparation of those compositions.

The invention relates also to the methods of application of the crop protection products, i.e. the methods of controlling pests of the mentioned type, such as spraying, atomising, dusting, coating, dressing, scattering or pouring, which are selected in accordance with the intended objectives and the prevailing circumstances, and to the use of the compositions for controlling pests of the mentioned type. Typical rates of concentration are from 0.1 to 1000 ppm, preferably from 0.1 to 500 ppm, of active ingredient. The rates of application per hectare are generally from 1 to 2000 g of active ingredient per hectare, especially from 10 to 1000 g/ha, preferably from 20 to 600 g/ha.

A preferred method of application in the area of crop protection is application to the foliage of the plants (foliar application), the frequency and the rate of application being

dependent upon the risk of infestation by the pest in question. However, the active ingredient can also penetrate the plants through the roots (systemic action) when the locus of the plants is impregnated with a liquid formulation or when the active ingredient is incorporated in solid form into the locus of the plants, for example into the soil, e.g. in granular form (soil application). In the case of paddy rice crops, such granules may be applied in metered amounts to the flooded rice field.

The crop protection products according to the invention are also suitable for protecting plant propagation material, including propagation material of genetically modified plants, e.g. seed, such as fruits, tubers or grains, or plant cuttings, against animal pests. The propagation material can be treated with the composition before planting: seed, for example, can be dressed before being sown. The active ingredients according to the invention can also be applied to grains (coating), either by impregnating the seeds in a liquid formulation or by coating them with a solid formulation. The composition can also be applied to the planting site when the propagation material is being planted, for example to the seed furrow during sowing. The invention relates also to such methods of treating plant propagation material and to the plant propagation material so treated.

Preparation Examples

In the following Examples, the preparation of avermectin B1 derivatives (mixtures of avermectin B1a and B1b derivative) is described. The B1b derivative generally represents about only from 5 to 10 % by weight of the mixtures and, for that reason, usually only the bands of the B1a derivative can be detected in the NMR spectrum.

Since the compounds are in most cases in the form of mixtures of the avermectin B1a and B1b derivative, characterisation by means of the customary physical data such as melting point or refractive index is of little use. For that reason, the compounds are characterised by means of NMR spectroscopy following purification by chromatography, or by reference to the retention times determined in analysis by means of HPLC (high-resolution liquid chromatography). The term "B1a" in the physical data on the Preparation Examples refers to the main component, wherein R_1 is sec-butyl. "B1b" represents the secondary component, wherein R_1 is isopropyl. In the case of the compounds for which a retention time is given only for the B1a derivative, it is not possible to determine the retention time for the B1b component owing to the small proportion of B1b derivative. Allocation of the correct structures of the B1a and B1b components is carried out by mass spectrometry.

The following method is used for the HPLC analysis:

HPLC gradient conditions			
solvent A:	0.01% trifluoroacetic acid in H ₂ O		
solvent B:	0.01% trifluoroacetic acid in CH ₃ CN		
time [min]	A [%]	B [%]	flow rate [μl/min]
0	80	20	500
0.1	50	50	500
10	5	95	500
15	0	100	500
17	0	100	500
17.1	80	20	500
22	80	20	500
column:	YMC-Pack ODS-AQ		
column length:	125 mm		
column internal diameter:	2 mm		
temperature:	40 °C		

The YMC-Pack ODS-AQ column used for chromatography of the compounds is produced by YMC, Alte Raesfelderstrasse 6, 46514 Schermbeck, Germany.

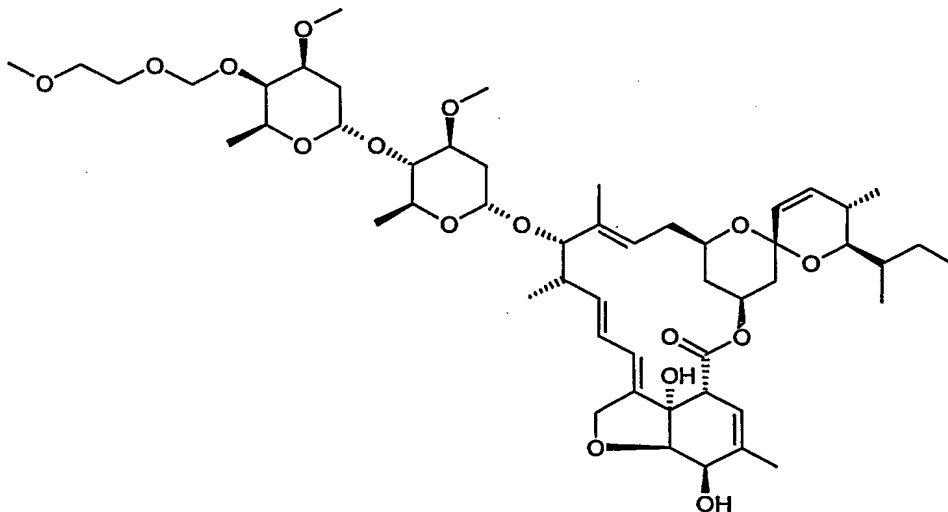
The abbreviations used in the physical data information have the following meanings:

s: singlet, MHz: megahertz, brs: broad singlet; t: triplet; m: multiplet; d: doublet; J: coupling constant; bd: broad doublet; LCMS: liquid chromatography mass spectrometry; t_{RT}: retention time in minutes; M+H: mass peak plus H; M+Na: mass peak plus Na. TBDMS in the Examples represents the radical -Si(CH₃)₂(tert-butyl). Mixing ratios of solvents are given in parts by volume. "Ether" is understood to mean diethyl ether.

CO[C@H]1O[C@H](CO[C@@H]2[C@@H](OC)[C@H](O[C@H]3[C@H](OC)[C@H](O[C@H]4[C@H](OC)[C@H](O[C@H]5[C@H](OC)[C@H](CO[C@H]6[C@H](OC)[C@H](O[C@H]7[C@H](OC)[C@H](COc8ccccc8)O7)O6)O5)O4)O3)O2)O1

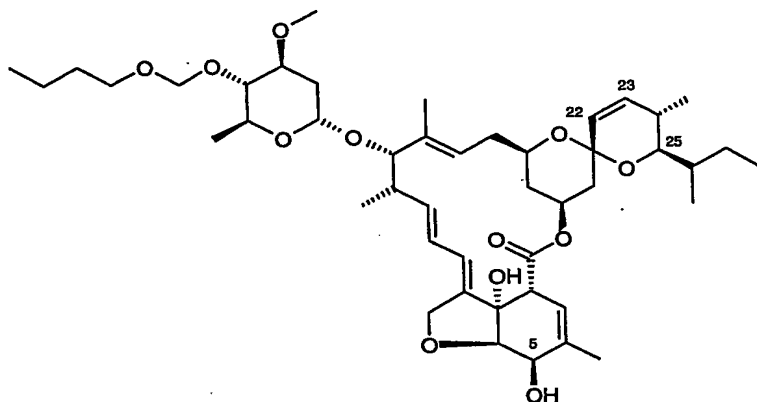
Step B: To a solution of 5-OTBDMS-4"-O-benzoyloxymethyl-Avermectin B₁ (obtained in step A) in 10 ml tetrahydrofuran is added 2.2 ml of a HF-pyridine solution (consisting of 25 g 70% HF-Pyridin, 27,5 ml tetrahydrofuran and 12,5 ml pyridine), and the mixture is stirred at room temperature for 12 hours, poured into water, extracted with ethyl acetate; the organic phase is washed with saturated sodium bicarbonate, dried over sodium sulfate, and concentrated *in vacuo*. The residue is purified by preparative HPLC to afford 4"-O-benzoyloxymethyl-Avermectin B₁. LCMS: B_{1a}: *t*_{RT}: 12.16 min., 1015 (M+Na).

Step B: To a solution of 5-OTBDMS-4"-O-benzylloxymethyl-Avermectin B₁ (obtained in step A) in 10 ml tetrahydrofuran is added 2.2 ml of a HF-pyridine solution (consisting of 25 g 70% HF-Pyridin, 27,5 ml tetrahydrofuran and 12,5 ml pyridine), and the mixture is stirred at room temperature for 12 hours, poured into water, extracted with ethyl acetate; the organic phase is washed with saturated sodium bicarbonate, dried over sodium sulfate, and concentrated *in vacuo*. The residue is purified by preparative HPLC to afford 4"-O-benzylloxymethyl-Avermectin B₁. LCMS: B_{1a}: *t*_{RT}: 12.16 min., 1015 (M+Na).

Example P.2: 4"-epi-O-(2-methoxyethoxymethyl)-Avermectin B₁

Step A: To a solution of 0.3 g of 5-OTBDMS-4"-epi-Avermectin B₁ and 0.31 g of N,N-diisopropylethylamine in 5 ml dichloromethane at 0°C is added 0.21 ml of 2-methoxyethoxymethyl chloride. The mixture is stirred at reflux for 6 hours. The reaction mixture is cooled to room temperature poured into water, extracted with ethyl acetate, dried over Na₂SO₄, and concentrated *in vacuo*, providing crude 5-OTBDMS-4"-epi-O-(2-methoxyethoxymethyl)-Avermectin B₁ which is used directly as follows:

Step B: To a solution of 5-OTBDMS-4"-epi-O-(2-methoxyethoxymethyl)-Avermectin B₁ in 10 ml tetrahydrofuran is added 3.5 ml of a HF-pyridine solution (consisting of 25 g 70% HF-Pyridin, 27,5 ml tetrahydrofuran and 12,5 ml pyridine), and the mixture is stirred at 50°C for 2.5 hours, poured into water, extracted with ethyl acetate; the organic phase is washed with saturated sodium bicarbonate, dried over sodium sulfate, and concentrated *in vacuo*. The residue is purified by flash-chromatography (silica gel hexane/ethyl acetate 1/1), to afford 4"-epi-O-(2-methoxyethoxymethyl)-Avermectin B₁. LCMS: B_{1a}: *t*_{RT}: 9.37 min., 983.5 (M+Na), 961.6 (M+H); B_{1a}: *t*_{RT}: 8.65 min., 969.5 (M+Na).

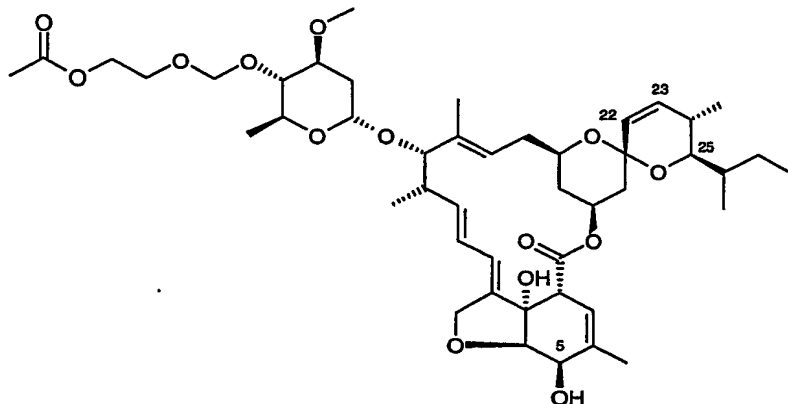
Example P.3: 4'-O-Butoxymethyl-Avermectin B₁ monosaccharide

Step A: To a solution of 5-OTBDMS-Avermectin B₁ monosaccharide (420 mg) and N,N-diisopropylethylamine (0.4 ml) in dichloromethane (5 ml) at room temperature is added chloromethyl *n*-butyl ether (220 mg). The mixture is stirred at 35 °C for 24 hours. The reaction mixture is poured into brine, extracted with ethyl acetate, dried over Na₂SO₄, and concentrated *in vacuo*. The residue is purified by flash chromatography (silica gel, hexane/ethyl acetate 4/1) providing 5-OTBDMS-4'-O-butoxymethyl-avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

Step B: To a solution of 5-OTBDMS-4'-O-butoxymethyl-avermectin B₁ monosaccharide (200 mg) in methanol (5 ml) at 0 °C is added methanesulphonic acid (0.02 ml). The reaction mixture is stirred for 1 hour and poured into saturated sodium bicarbonate, extracted with ethyl acetate, dried over Mg₂SO₄, and concentrated *in vacuo*. Flash chromatography (silica gel, hexane/ethyl acetate 3/0) affords 4'-O-butoxymethyl-avermectin B₁ monosaccharide.

4'-O-Butoxymethyl-Avermectin B₁ monosaccharide: B_{1a} C₄₆H₇₀O₁₂, MW: 814.5. LCMS: *t*_{RT}: 11.4 minutes, 837.3 (M+Na); 1H NMR (300 MHz, CDCl₃) selected data, δH (ppm): 3.15 (t, *J* = 8.5 Hz, 1H, CH-4'), 3.28 (m, 1H, CH-2), 3.44 (s, 3H, OCH₃). B_{1b} C₄₅H₆₈O₁₂, MW: 800.5. LCMS: *t*_{RT}: 10.6 823.5 (M+Na);

Example P.4: 4'-O-(1-Acetoxy-ethoxy)methyl-Avermectin B₁ monosaccharide

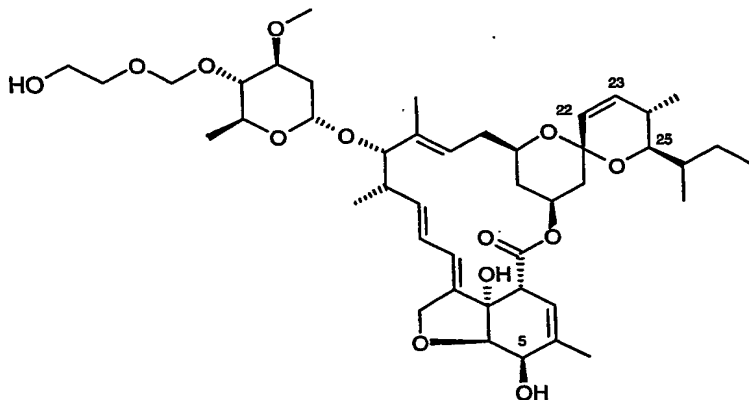


Step A: To a solution of 5-OTBDMS-Avermectin B₁ monosaccharide (422 mg) and N,N-diisopropylethylamine (0.9 ml) in dichloromethane (5 ml) at room temperature is added 1-acetoxy-2-chloromethoxyethane (610 mg). The mixture is stirred at 45 °C for 32 hours. The reaction mixture is poured into brine, extracted with ethyl acetate, dried over MgSO₄, and concentrated *in vacuo*. The residue is purified by flash chromatography (silica gel, hexane/ethyl acetate 4/1) providing 5-OTBDMS-4'-O-(1-acetoxy-ethoxy)methyl-avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

Step B: To a solution of 5-OTBDMS-4'-O-(1-acetoxy-ethoxy)methyl-avermectin B₁ monosaccharide (384 mg) in Tetrahydrofuran (5 ml) is added pyridine (0.2 ml) and 0.2 ml of a 70% HF-pyridine solution. The mixture is stirred for 18 hours at room temperature, poured into aqueous NaHCO₃ (50%), extracted with ethyl acetate, dried over MgSO₄, and concentrated *in vacuo*. Flash chromatography (silica gel, hexane/ethyl acetate 1/1) affords 4'-O-(1-acetoxy-ethoxy)methyl-avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

4'-O-(1-Acetoxy-ethoxy)methyl-avermectin B₁ monosaccharide: B_{1a} C₄₆H₆₈O₁₄, MW: 844.5. LCMS: *t*_{RT}: 8.49 minutes, 867.5 (M+Na); B_{1b} C₄₅H₆₆O₁₂, MW: 830.5. LCMS: *t*_{RT}: 7.82 minutes, 853.5 (M+Na).

Example P.5: 4'-O-(1-hydroxy-ethoxy)methyl-Avermectin B₁ monosaccharide

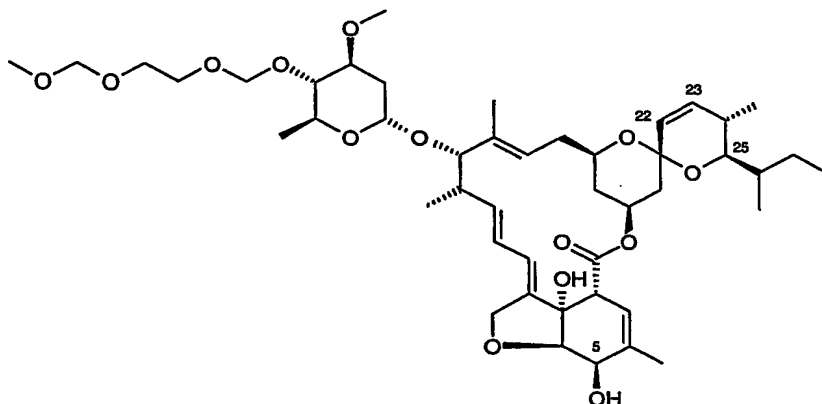


Step A: To a methanolic solution (10 ml) of 5-OTBDMS-4'-O-(1-acetoxy-ethoxy)methyl-avermectin B₁ monosaccharide (410 mg) cooled to 0 °C is added ammonium hydroxide (2 ml, 25% in H₂O). The mixture is stirred at room temperature for 4 hours at room temperature and then concentrated *in vacuo*. Flash chromatography (silica gel, hexane/ethyl acetate 1/1) affords 4'-O-(1-hydroxy-ethoxy)methyl-avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

Step B: To a solution of 5-OTBDMS-4'-O-(1-hydroxy-ethoxy)methyl-avermectin B₁ monosaccharide (140 mg) in Tetrahydrofuran (2 ml) is added pyridine (80 µl) and 70% HF-pyridine solution (80 µl). The mixture is stirred for 5 d at room temperature, poured into aqueous NaHCO₃ (50%), extracted with ethyl acetate, dried over MgSO₄, and concentrated *in vacuo*. Flash chromatography (silica gel, hexane/ethyl acetate 3/7) affords 4'-O-(1-hydroxy-ethoxy)methyl-avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

4'-O-(1-hydroxy-ethoxy)methyl-avermectin B₁ monosaccharide: B_{1a} C₄₄H₆₆O₁₃, MW: 802.5. LCMS: *t*_{RT}: 6.99 minutes, 825.4 (M+Na); B_{1b} C₄₃H₆₄O₁₃, MW: 788.4. LCMS: *t*_{RT}: 6.35 minutes, 811.4 (M+Na).

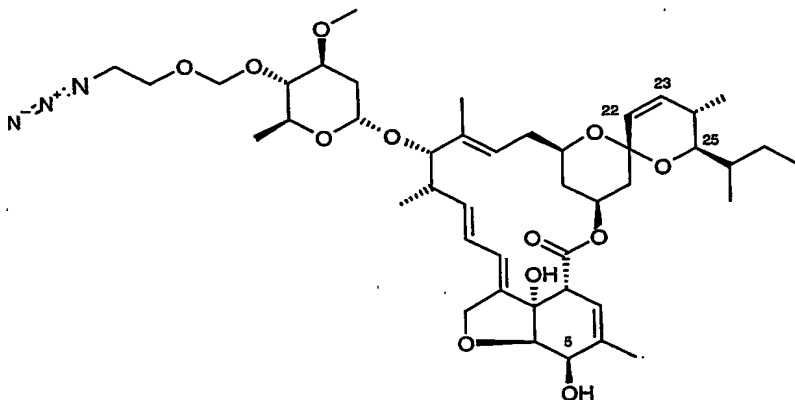
Example P.6: 4'-O-(1-Methoxymethoxy-ethoxy)methyl-Avermectin B₁ mono-saccharide



Step A: To a solution 5-OTBDMS-4'-O-(1-hydroxy-ethoxy)methyl-avermectin B₁ monosaccharide (138 mg) and N,N-diisopropylethylamine (90 μ l) in dichloromethane (5 ml) at room temperature is added chloromethyl methyl ether (29 μ l). The mixture is stirred at 35 °C for 20 hours. The reaction mixture is poured into water, extracted with dichloromethane, dried over MgSO₄ and concentrated *in vacuo*. The residue is purified by flash chromatography (silica gel, hexane/ethyl acetate 7/3) providing 5-OTBDMS-4'-O-(1-methoxymethoxy-ethoxy)methyl-Avermectin B₁ monosaccharide, which is characterized by its mass and NMR spectra.

Step B: To a solution of 5-OTBDMS-4'-O-(1-methoxymethoxy-ethoxy)methyl-avermectin B₁ mono-saccharide (100 mg) in Tetrahydrofuran (1.5 ml) is added pyridine (50 μ l) and 70% HF-pyridine solution (50 μ l). The mixture is stirred for 48 hours at room temperature, poured into saturated aqueous NaHCO₃, extracted with ethyl acetate, dried over MgSO₄ and concentrated *in vacuo*. Flash chromatography (silica gel, hexane/ethyl acetate 1/1) affords 4'-O-(1-methoxymethoxy-ethoxy)methyl-avermectin B₁ mono-saccharide which is characterized by its mass and NMR spectra.

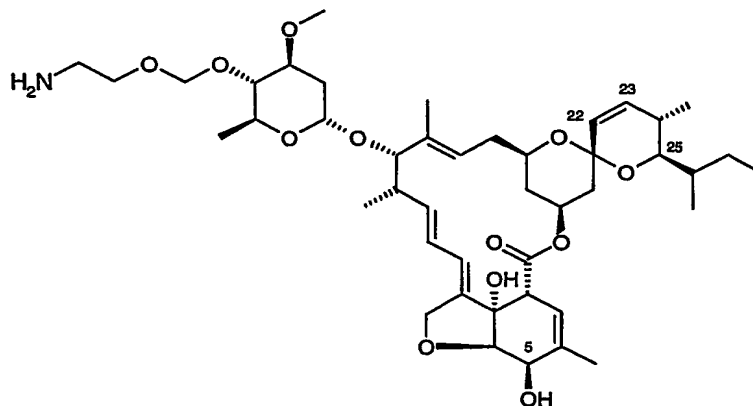
4'-O-(1-Methoxymethoxy-ethoxy)methyl-avermectin B₁ monosaccharide: B_{1a}
 C₄₆H₇₀O₁₄, MW: 846.5. LCMS: *t*_{RT}: 8.73 minutes, 869.4 (M+Na); B_{1b} C₄₅H₆₈O₁₄, MW: 832.5.
 LCMS: *t*_{RT}: 7.89 minutes, 855.4 (M+Na).

Example P.7: 4'-O-(1-azido-ethoxy)methyl-Avermectin B₁ monosaccharide

Step A: To a solution 5-OTBDMS-4'-O-(1-hydroxy-ethoxy)methyl-avermectin B₁ monosaccharide (642 mg) in N,N-dimethylacetamide (7 ml) cooled to 0°C room temperature is added triphenylphosphine (551 mg) and tetrabromomethane (696 mg). The mixture is stirred for 0.5 hours after which time sodium azide (228 mg) is added. The reaction mixture is stirred at 40 °C for 1 hours and then poured into water, extracted with ethyl acetate, dried over MgSO₄ and concentrated *in vacuo*. The residue is purified by flash chromatography (silica gel, hexane/ethyl acetate 5/1) providing 5-OTBDMS-4'-O-(1-azido-ethoxy)methyl-Avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

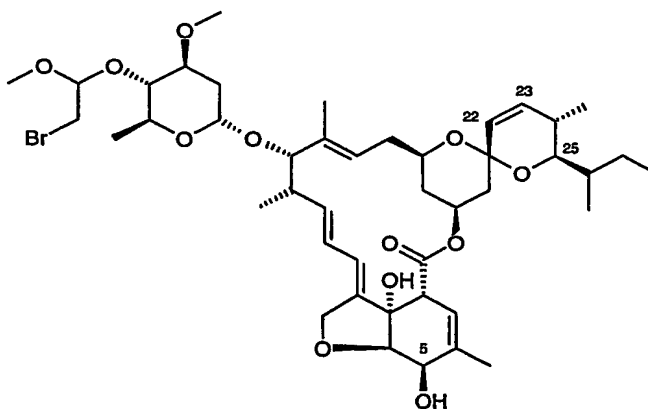
Step B: To a solution of 5-OTBDMS-4'-O-(1-azido-ethoxy)methyl-Avermectin B₁ monosaccharide (98 mg) in tetrahydrofuran (2.0 ml) is added pyridine (50 µl) and 70% HF-pyridine solution (50 µl). The mixture is stirred for 48 hours at room temperature, poured into saturated aqueous NaHCO₃, extracted with ethyl acetate, dried over MgSO₄ and concentrated *in vacuo*. Flash chromatography (silica gel, hexane/ethyl acetate 1/1) affords 4'-O-(1-azido-ethoxy)methyl-avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

4'-O-(1-Azido-ethoxy)methyl-avermectin B₁ monosaccharide: B_{1a} C₄₄H₆₅N₃O₁₂, MW: 827.5. LCMS: *t*_{RT}: 9.76 minutes, 850.5 (M+Na); B_{1b} C₄₃H₆₃N₃O₁₂, MW: 813.4 LCMS: *t*_{RT}: 9.01 minutes, 836.4 (M+Na).

Example P.8: 4'-O-(1-amino-ethoxy)methyl-Avermectin B₁ monosaccharide

Step A: To a solution of 4'-O-(1-azido-ethoxy)methyl-avermectin B₁ monosaccharide is added trimethylphosphine (150 μ l, 1.0 M in tetrahydrofuran) and water (30 μ l). The reaction mixture is stirred at room temperature for 48 hours and then poured into water, extracted with ethyl acetate, dried over MgSO₄ and concentrated *in vacuo*. The residue is purified by flash chromatography (silica gel, hexane/ethyl acetate 5/1) providing 4'-O-(1-amino-ethoxy)methyl-Avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

4'-O-(1-Amino-ethoxy)methyl-avermectin B₁ monosaccharide: B_{1a} C₄₄H₆₇NO₁₂, MW: 801.5. LCMS: t_{RT} : 4.11 minutes, 802.5 (M+Na).

Example P9: 4'-O-(1-bromomethyl-1-methoxy)methyl-Avermectin B₁ monosaccharide

Step A: A mixture of 5-OTBDMS-Avermectin B₁ monosaccharide (1.0 g), mercury acetate (190 mg) and ethyl vinyl ether (10 ml) is refluxed for 8h. The reaction mixture is poured into aqueous Na₂CO₃ and extracted with ethyl acetate. Drying over Na₂SO₄, and

concentration *in vacuo* provides 5-OTBDMS-4'-O-vinyl-avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

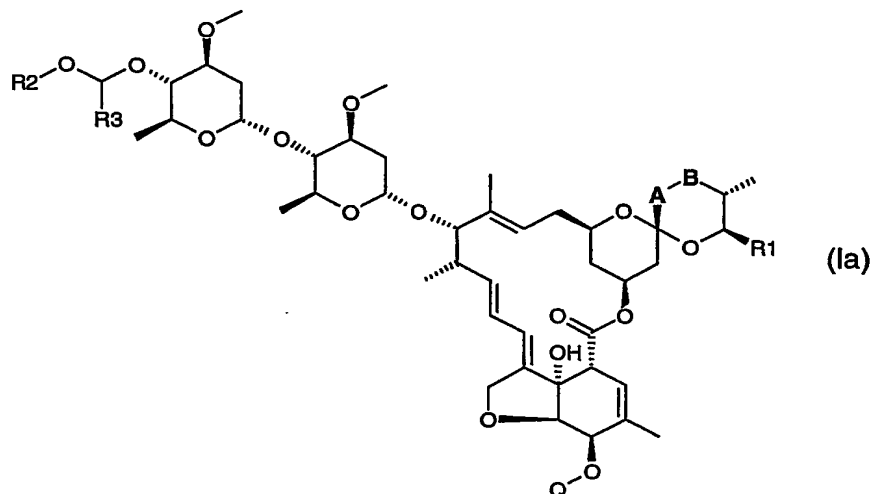
Step B: To a solution of 5-OTBDMS-4'-O-vinyl-avermectin B₁ monosaccharide (200 mg) in methanol is added N-bromosuccinimide (46 mg). After stirring at room temperature for 24 h the solvent is removed *in vacuo* providing 5-OTBDMS-4'-O-(1-bromomethyl-1-methoxy)methyl-Avermectin B₁ monosaccharide as a mixture of diastereoisomers which is characterized by its mass and NMR spectra.

5-OTBDMS-4'-O-(1-bromomethyl-1-methoxy)methyl-Avermectin B₁ monosaccharide: B_{1a} C₅₀H₇₉BrO₁₂Si, MW: 978.5. LCMS: isomer 1 : t_{RT} , 14.94 min., 979.5 (M+H); isomer 2: t_{RT} , 14.64 min., 1001.4 (M+Na).

Step C: To a solution of 5-OTBDMS-4'-O-(1-bromomethyl-1-methoxy)methyl-avermectin B₁ monosaccharide (200 mg) in THF (2.0 ml) is added pyridine (50 μ l) and 70% HF-pyridine solution (100 μ l). The mixture is stirred for 48 h at room temperature, poured into saturated aqueous NaHCO₃, extracted with ethyl acetate, dried over MgSO₄ and concentrated *in vacuo*. Flash chromatography (silica gel, hexane/ethyl acetate 1/1) affords 4'-O-(1-bromomethyl-1-methoxy)methyl-Avermectin B₁ monosaccharide which is characterized by its mass and NMR spectra.

4'-O-(1-Bromomethyl-1-methoxy)methyl-Avermectin B₁ monosaccharide: B_{1a} C₄₄H₆₅BrO₁₂, MW: 864.4. LCMS: isomer 1 t_{RT} , 10.56 min., 865.4 (M+H); isomer 2 : t_{RT} , 10.35 min., 865.4 (M+Na).

Example P10: The compounds listed in tables can also be prepared analogously to the above Preparation Examples or by other methods known to the person skilled in the art.

Table 1: Compounds of formula

wherein R_1 is sec-butyl (B1a) or isopropyl (B1b), A-B is $-\text{CH}=\text{CH}-$ and Q is hydrogen:

No.	R_2	R_3	Retention time (min)	
			B1a	B1b
1.1	$\text{CH}_2\text{C}_6\text{H}_5$	H	12.16	11.64
1.2	$p\text{-ClC}_6\text{H}_5$	H		
1.3	$(\text{CH}_2)_7\text{CH}_3$	H		
1.4	$(\text{CH}_2)_3\text{CH}_3$	H		
1.5	CH_2CH_3	H	10.02	9.36
1.6	CH_3	H	10.49	
1.7	$\text{CH}(\text{CH}_3)_2$	H		
1.8	$\text{CH}_2\text{CH}_2\text{OCH}_3$	H	10.46	9.72
1.9	$\text{CH}_2\text{CH}_2\text{OH}$	H	8.53	
1.10	$\text{CH}(\text{CH}_3)\text{CH}_2\text{OH}$	H		
1.11	$\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	H	10.98	10.67
1.12	$\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$	H		
1.13	$\text{CH}_2\text{CH}_2\text{OC}(=\text{O})\text{CH}_3$	H	10.08	9.39
1.14	$\text{CH}_2(\text{CH}_2)_2\text{OC}(=\text{O})\text{CH}_3$	H	11.18	10.50
1.15	$\text{CH}(\text{CH}_3)\text{CH}_2\text{OC}(=\text{O})\text{CH}_3$	H		
1.16	$\text{CH}(\text{CH}_3)(\text{CH}_2)_2\text{OC}(=\text{O})\text{CH}_3$	H		
1.17	$\text{CH}_2\text{CH}_2\text{N}_3$	H		
1.18	$\text{CH}_2(\text{CH}_2)_2\text{N}_3$	H	16.16	

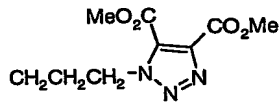
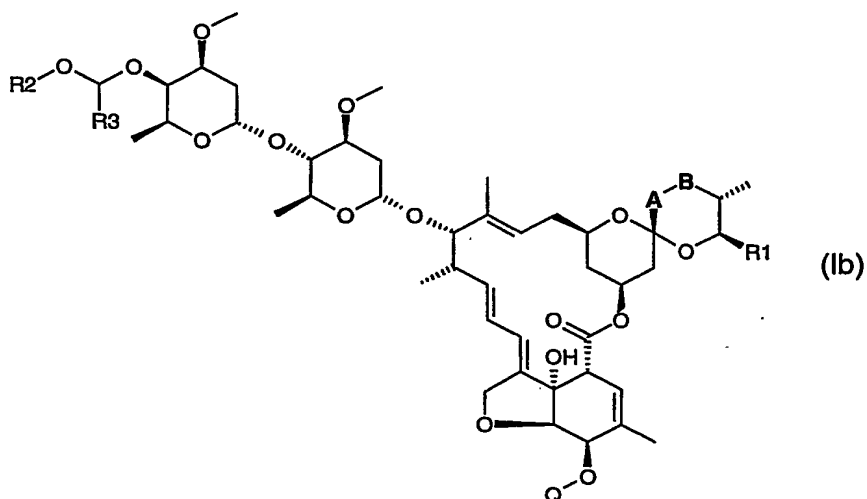
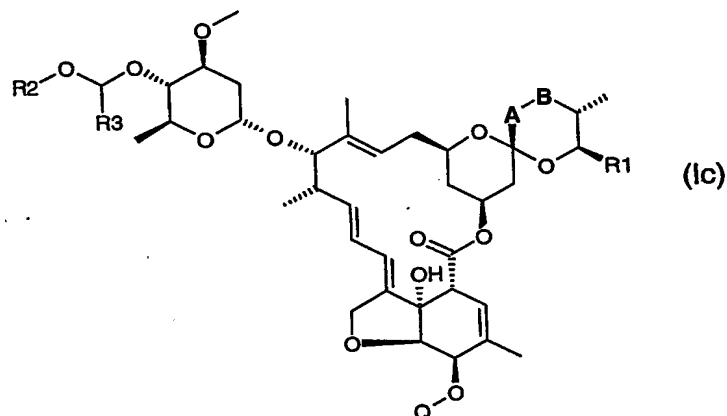
No.	R ₂	R ₃	Retention time (min)	
			B1a	B1b
1.19	CH ₂ CH ₂ NH ₂	H		
1.20	CH ₂ CH ₂ OCH ₂ OCH ₃	H		
1.21		H		
1.22	n-Pr	H		
1.23	n-Hexyl	H		
1.24	CH(CH ₃)CH ₂ CH ₂ N ₃	H		
1.25	CH ₂ CH ₂ OC(=O)OCH ₃	H		
1.26	CH ₂ CH ₂ OC(=O)NHCH ₃	H		
1.27	CH ₂ CH ₂ OC(=O)N(CH ₃) ₂	H		
1.28	CH ₂ CH ₂ NHC(=O)NHCH ₃	H		
1.29	CH ₂ CH ₂ NHC(=O)NHC ₆ H ₅	H		
1.30	CH ₂ CH ₂ NHC(=O)OC ₆ H ₅	H		
1.31	CH ₂ CH ₂ NHC(=S)NHC ₆ H ₅	H		
1.32	CH ₂ CH ₂ NHC(=O)OCH ₃	H		
1.33	CH ₂ CH ₂ NHC(=O)NHCH ₃	H		
1.34	CH ₂ CH ₂ NHC(=O)N(CH ₃) ₂	H		
1.35	CH ₂ CH ₂ NHC(=S)NHCH ₃	H		
1.36	CH ₂ CH ₂ NHCH ₃	H		
1.37	CH ₂ CH ₂ N(CH ₃) ₂	H		
1.38	CH ₂ CH ₂ SCH ₃	H	10.08	9.33
1.39	CH ₂ CH ₂ S(O)CH ₃	H	7.09	6.45
1.40	CH ₂ CH ₂ S(O) ₂ CH ₃	H	7.47	6.88
1.41	CH ₃	CH ₂ Br	10.56, 10.35	
1.42	CH ₂ CH=CH ₂	CH ₂ Br	11.26, 11.09	10.7, 10.6

Table 2: Compounds of formula

wherein R_1 is sec-butyl (B1a) or isopropyl (B1b), A-B is $-\text{CH}=\text{CH}-$ and Q is hydrogen:

No.	R_2	R_3	Retention time (min)	
			B1a	B1b
2.1	$\text{CH}_2\text{C}_6\text{H}_5$	H		
2.2	$p\text{ClC}_6\text{H}_5$	H		
2.3	$(\text{CH}_2)_7\text{CH}_3$	H		
2.4	$(\text{CH}_2)_3\text{CH}_3$	H		
2.5	CH_2CH_3	H	7.14	
2.6	CH_3	H	9.65	8.91
2.7	$\text{CH}(\text{CH}_3)_2$	H		
2.8	$\text{CH}_2\text{CH}_2\text{OCH}_3$	H	9.39	8.69
2.9	$\text{CH}_2\text{CH}_2\text{OH}$	H	9.84	
2.10	$\text{CH}(\text{CH}_3)\text{CH}_2\text{OH}$	H		
2.11	$\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	H		
2.12	$\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$	H		
2.13	$\text{CH}_2\text{CH}_2\text{OC}(=\text{O})\text{CH}_3$	H	11.20	
2.14	$\text{CH}_2(\text{CH}_2)_2\text{OC}(=\text{O})\text{CH}_3$	H	12.42	11.72

Table 3: Compounds of formula



wherein R_1 is sec-butyl (B1a) or isopropyl (B1b), A-B is $-\text{CH}=\text{CH}-$ and Q is hydrogen

No.	R_2	R_3	Retention time (min)	
			B1a	B1b
3.1	$\text{CH}_2\text{C}_6\text{H}_5$	H		
3.2	<i>p</i> ClC_6H_5	H		
3.3	$(\text{CH}_2)_7\text{CH}_3$	H	13.81	
3.4	$(\text{CH}_2)_3\text{CH}_3$	H	11.36	10.61
3.5	CH_2CH_3	H		
3.6	CH_3	H	9.39	8.69
3.7	$\text{CH}(\text{CH}_3)_2$	H	11.20	10.45
3.8	$\text{CH}_2\text{CH}_2\text{OCH}_3$	H		
3.9	$\text{CH}_2\text{CH}_2\text{OH}$	H	6.99	6.35
3.10	$\text{CH}(\text{CH}_3)\text{CH}_2\text{OH}$	H	8.64	7.95
3.11	$\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	H	7.43	6.72
3.12	$\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$	H	8.70	8.00
3.13	$\text{CH}_2\text{CH}_2\text{OC}(=\text{O})\text{CH}_3$	H	8.48	7.79
3.14	$\text{CH}_2(\text{CH}_2)_2\text{OC}(=\text{O})\text{CH}_3$	H	9.28	8.64
3.15	$\text{CH}(\text{CH}_3)\text{CH}_2\text{OC}(=\text{O})\text{CH}_3$	H	9.44	8.75
3.16	$\text{CH}(\text{CH}_3)(\text{CH}_2)_2\text{OC}(=\text{O})\text{CH}_3$	H	9.71	9.07
3.17	$\text{CH}_2\text{CH}_2\text{N}_3$	H	9.76	9.01
3.18	$\text{CH}_2(\text{CH}_2)_2\text{N}_3$	H	10.89	10.09
3.19	$\text{CH}_2\text{CH}_2\text{NH}_2$	H	4.11	
3.20	$\text{CH}_2\text{CH}_2\text{OCH}_2\text{OCH}_3$	H	8.69	7.89


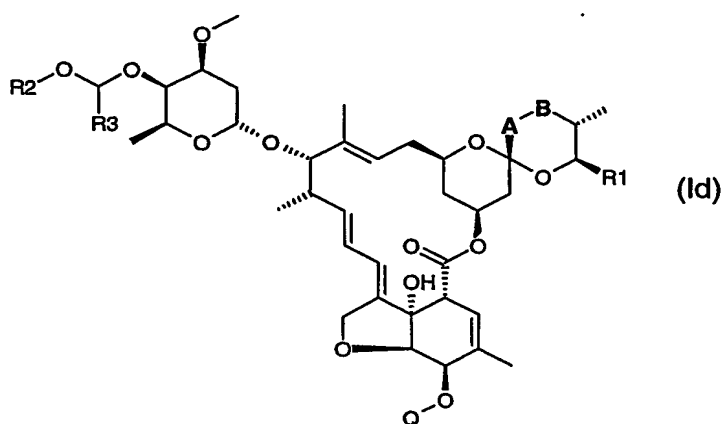
No.	R ₂	R ₃	Retention time (min)	
			B1a	B1b
3.21		H	9.65	8.96

Table 4: Compounds of formula

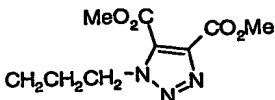


wherein R₁ is sec-butyl (B1a) or isopropyl (B1b), A-B is -CH=CH- and Q is hydrogen:

No.	R ₂	R ₃	Retention time (min)	
			B1a	B1b
4.1	CH ₂ C ₆ H ₅	H	10.72	10.03
4.2	<i>p</i> ClC ₆ H ₅	H	11.63	
4.3	(CH ₂) ₇ CH ₃	H	13.71	13.17
4.4	(CH ₂) ₃ CH ₃	H	11.15	10.29
4.5	CH ₂ CH ₃	H		
4.6	CH ₃	H		
4.7	CH(CH ₃) ₂	H	9.92	9.17
4.8	CH ₂ CH ₂ OCH ₃	H		
4.9	CH ₂ CH ₂ OH	H	6.24	5.66
4.10	CH(CH ₃)CH ₂ OH	H	6.94	6.45
4.11	CH ₂ CH ₂ CH ₂ OH	H	6.45	5.87
4.12	CH(CH ₃)CH ₂ CH ₂ OH	H	6.89	6.25
4.13	CH ₂ CH ₂ OC(=O)CH ₃	H	8.16	7.57
4.14	CH ₂ (CH ₂) ₂ OC(=O)CH ₃	H	8.69	8.05

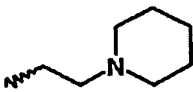
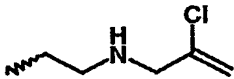
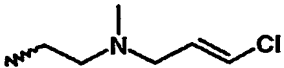
No.	R ₂	R ₃	Retention time (min)	
			B1a	B1b
4.15	CH(CH ₃)CH ₂ OC(=O)CH ₃	H	8.49	7.95
4.16	CH(CH ₃)(CH ₂) ₂ OC(=O)CH ₃	H	8.97	8.32
4.17	CH ₂ CH ₂ N ₃	H	8.75	8.11
4.18	CH ₂ (CH ₂) ₂ N ₃	H	9.33	8.69
4.19	CH ₂ CH ₂ NH ₂	H	11.09	10.35

Table A: Compounds of the formula (I)

No.	R ₂	R ₃
A.1	CH ₂ C ₆ H ₅	H
A.2	<i>p</i> -ClC ₆ H ₅	H
A.3	(CH ₂) ₇ CH ₃	H
A.4	(CH ₂) ₃ CH ₃	H
A.5	CH ₂ CH ₃	H
A.6	CH ₃	H
A.7	CH(CH ₃) ₂	H
A.8	CH ₂ CH ₂ OCH ₃	H
A.9	CH ₂ CH ₂ OH	H
A.10	CH(CH ₃)CH ₂ OH	H
A.11	CH ₂ CH ₂ CH ₂ OH	H
A.12	CH(CH ₃)CH ₂ CH ₂ OH	H
A.13	CH ₂ CH ₂ OC(=O)CH ₃	H
A.14	CH ₂ (CH ₂) ₂ OC(=O)CH ₃	H
A.15	CH(CH ₃)CH ₂ OC(=O)CH ₃	H
A.16	CH(CH ₃)(CH ₂) ₂ OC(=O)CH ₃	H
A.17	CH ₂ CH ₂ N ₃	H
A.18	CH ₂ (CH ₂) ₂ N ₃	H
A.19	CH ₂ CH ₂ NH ₂	H
A.20	CH ₂ CH ₂ OCH ₂ OCH ₃	H
A.21		H

No.	R ₂	R ₃
A.22	n-Pr	H
A.23	n-Hexyl	H
A.24	CH(CH ₃)CH ₂ CH ₂ N ₃	H
A.25	CH ₂ CH ₂ OC(=O)OCH ₃	H
A.26	CH ₂ CH ₂ OC(=O)NHCH ₃	H
A.27	CH ₂ CH ₂ OC(=O)N(CH ₃) ₂	H
A.28	CH ₂ CH ₂ NHC(=O)NHCH ₃	H
A.29	CH ₂ CH ₂ NHC(=O)NHC ₆ H ₅	H
A.30	CH ₂ CH ₂ NHC(=O)OC ₆ H ₅	H
A.31	CH ₂ CH ₂ NHC(=S)NHC ₆ H ₅	H
A.32	CH ₂ CH ₂ NHC(=O)OCH ₃	H
A.33	CH ₂ CH ₂ NHC(=O)NHCH ₃	H
A.34	CH ₂ CH ₂ NHC(=O)N(CH ₃) ₂	H
A.35	CH ₂ CH ₂ NHC(=S)NHCH ₃	H
A.36	CH ₂ CH ₂ NHCH ₃	H
A.37	CH ₂ CH ₂ N(CH ₃) ₂	H
A.38	CH ₂ CH ₂ SCH ₃	H
A.39	CH ₂ CH ₂ S(O)CH ₃	H
A.40	CH ₂ CH ₂ S(O) ₂ CH ₃	H
A.41	CH ₃	CH ₂ Br
A.42	CH ₂ CH=CH ₂	CH ₂ Br
A.43	CH ₂ CH ₂ NHCHO	H
A.44	CH ₂ CH ₂ N(CH ₃)CHO	H
A.45	CH ₂ CH ₂ NHCH ₂ COOCH ₃	H
A.46	CH ₂ COCH ₃	H
A.47	-CH ₂ -CH ₂ -NH-C(=O)-CH ₃	H
A.48	-CH ₂ -CH ₂ -NH-C(=O)-CH ₂ -O-CH ₃	H
A.49	-CH ₂ -CH ₂ -N(CH ₃)-C(=O)-CH ₃	H
A.50	-CH ₂ -CH ₂ -N(CH ₃)-C(=O)-CH ₂ -O-CH ₃	H
A.51	-CH ₂ -CH ₂ -CH ₂ -NH-C(=O)-H	H
A.52	-CH ₂ -CH ₂ -CH ₂ -NH-C(=O)-CH ₃	H
A.53	-CH ₂ -CH ₂ -CH ₂ -NH-C(=O)-CH ₂ -O-CH ₃	H



No.	R ₂	R ₃
A.75		H
A.76		H
A.77		H

TBDMS in the following table represents the radical $-\text{Si}(\text{CH}_3)_2(\text{tert-butyl})$.

Table 5: Compounds of the formula (Ia) wherein R₁ is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R₂ and R₃ for each compound corresponds to a line A.1 to A.77 of table A.

Table 6: Compounds of the formula (Ia) wherein R₁ is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R₂ and R₃ for each compound corresponds to a line A.1 to A.77 of table A.

Table 7: Compounds of the formula (Ia) wherein R₁ is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R₂ and R₃ for each compound corresponds to a line A.1 to A.77 of table A.

Table 8: Compounds of the formula (Ia) wherein R₁ is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R₂ and R₃ for each compound corresponds to a line A.1 to A.77 of table A.

Table 9: Compounds of the formula (Ia) wherein R₁ is cyclohexyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R₂ and R₃ for each compound corresponds to a line A.1 to A.77 of table A.

Table 10: Compounds of the formula (Ia) wherein R₁ is cyclohexyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R₂ and R₃ for each compound corresponds to a line A.1 to A.77 of table A.

Table 11: Compounds of the formula (Ia) wherein R₁ is cyclohexyl, A-B is VQ is H and the combination of the substituents R₂ and R₃ for each compound corresponds to a line A.1 to A.77 of table A.

Table 12: Compounds of the formula (Ia) wherein R_1 is cyclohexyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 13: Compounds of the formula (Ia) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 14: Compounds of the formula (Ia) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 15: Compounds of the formula (Ia) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 16: Compounds of the formula (Ia) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 17: Compounds of the formula (Ia) wherein R_1 is ethyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 18: Compounds of the formula (Ia) wherein R_1 is ethyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 19: Compounds of the formula (Ia) wherein R_1 is ethyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 20: Compounds of the formula (Ia) wherein R_1 is ethyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 21: Compounds of the formula (Ia) wherein R_1 is methyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 22: Compounds of the formula (Ia) wherein R_1 is methyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 23: Compounds of the formula (Ia) wherein R_1 is methyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 24: Compounds of the formula (Ia) wherein R_1 is methyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 25: Compounds of the formula (Ia) wherein R_1 is i-propyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 26: Compounds of the formula (Ia) wherein R_1 is i-propyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 27: Compounds of the formula (Ia) wherein R_1 is i-propyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 28: Compounds of the formula (Ia) wherein R_1 is i-propyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 29: Compounds of the formula (Ib) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 30: Compounds of the formula (Ib) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 31: Compounds of the formula (Ib) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 32: Compounds of the formula (Ib) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 33: Compounds of the formula (Ib) wherein R_1 is cyclohexyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 34: Compounds of the formula (Ib) wherein R_1 is cyclohexyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 35: Compounds of the formula (Ib) wherein R_1 is cyclohexyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 36: Compounds of the formula (Ib) wherein R_1 is cyclohexyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 37: Compounds of the formula (Ib) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 38: Compounds of the formula (Ib) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 39: Compounds of the formula (Ib) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 40: Compounds of the formula (Ib) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 41: Compounds of the formula (Ib) wherein R_1 is ethyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 42: Compounds of the formula (Ib) wherein R_1 is ethyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 43: Compounds of the formula (Ib) wherein R_1 is ethyl, A-B is $-\text{CH=CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 44: Compounds of the formula (Ib) wherein R_1 is ethyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 45: Compounds of the formula (Ib) wherein R_1 is methyl, A-B is $-\text{CH=CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 46: Compounds of the formula (Ib) wherein R_1 is methyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 47: Compounds of the formula (Ib) wherein R_1 is methyl, A-B is $-\text{CH=CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 48: Compounds of the formula (Ib) wherein R_1 is methyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 49: Compounds of the formula (Ib) wherein R_1 is i-propyl, A-B is $-\text{CH=CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 50: Compounds of the formula (Ib) wherein R_1 is i-propyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 51: Compounds of the formula (Ib) wherein R_1 is i-propyl, A-B is $-\text{CH=CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 52: Compounds of the formula (Ib) wherein R_1 is i-propyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 53: Compounds of the formula (Ic) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 54: Compounds of the formula (Ic) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 55: Compounds of the formula (Ic) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 56: Compounds of the formula (Ic) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 57: Compounds of the formula (Ic) wherein R_1 is cyclohexyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 58: Compounds of the formula (Ic) wherein R_1 is cyclohexyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 59: Compounds of the formula (Ic) wherein R_1 is cyclohexyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 60: Compounds of the formula (Ic) wherein R_1 is cyclohexyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 61: Compounds of the formula (Ic) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 62: Compounds of the formula (Ic) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 63: Compounds of the formula (Ic) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 64: Compounds of the formula (Ic) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 65: Compounds of the formula (Ic) wherein R_1 is ethyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 66: Compounds of the formula (Ic) wherein R_1 is ethyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 67: Compounds of the formula (Ic) wherein R_1 is ethyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 68: Compounds of the formula (Ic) wherein R_1 is ethyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 69: Compounds of the formula (Ic) wherein R_1 is methyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 70: Compounds of the formula (Ic) wherein R_1 is methyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 71: Compounds of the formula (Ic) wherein R_1 is methyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 72: Compounds of the formula (Ic) wherein R_1 is methyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 73: Compounds of the formula (Ic) wherein R_1 is i-propyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 74: Compounds of the formula (Ic) wherein R_1 is i-propyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 75: Compounds of the formula (Ic) wherein R_1 is i-propyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 76: Compounds of the formula (Ic) wherein R_1 is i-propyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 77: Compounds of the formula (Id) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 78: Compounds of the formula (Id) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 79: Compounds of the formula (Id) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}=\text{CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 80: Compounds of the formula (Id) wherein R_1 is sec-butyl or isopropyl, A-B is $-\text{CH}_2-\text{CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 81: Compounds of the formula (Id) wherein R_1 is cyclohexyl, A-B is $-\text{CH}=\text{CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 82: Compounds of the formula (Id) wherein R_1 is cyclohexyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 83: Compounds of the formula (Id) wherein R_1 is cyclohexyl, A-B is $-\text{CH=CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 84: Compounds of the formula (Id) wherein R_1 is cyclohexyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 85: Compounds of the formula (Id) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH=CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 86: Compounds of the formula (Id) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 87: Compounds of the formula (Id) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH=CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 88: Compounds of the formula (Id) wherein R_1 is 1-methyl-butyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 89: Compounds of the formula (Id) wherein R_1 is ethyl, A-B is $-\text{CH=CH}-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 90: Compounds of the formula (Id) wherein R_1 is ethyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 91: Compounds of the formula (Id) wherein R_1 is ethyl, A-B is $-\text{CH=CH}-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 92: Compounds of the formula (Id) wherein R_1 is ethyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 93: Compounds of the formula (Id) wherein R_1 is methyl, A-B is $-\text{CH=CH-}$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 94: Compounds of the formula (Id) wherein R_1 is methyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 95: Compounds of the formula (Id) wherein R_1 is methyl, A-B is $-\text{CH=CH-}$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 96: Compounds of the formula (Id) wherein R_1 is methyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 97: Compounds of the formula (Id) wherein R_1 is i-propyl, A-B is $-\text{CH=CH-}$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 98: Compounds of the formula (Id) wherein R_1 is i-propyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is TBDMS and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 99: Compounds of the formula (Id) wherein R_1 is i-propyl, A-B is $-\text{CH=CH-}$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Table 100: Compounds of the formula (Id) wherein R_1 is i-propyl, A-B is $-\text{CH}_2\text{-CH}_2-$, Q is H and the combination of the substituents R_2 and R_3 for each compound corresponds to a line A.1 to A.77 of table A.

Formulation Examples for use in crop protection (% = percent by weight)Example F1: Emulsifiable concentrates

	a)	b)	c)
active ingredient	25%	40%	50%
calcium dodecylbenzenesulfonate	5%	8%	6%
castor oil polyethylene glycol ether (36 mol EO)	5%	-	-
tributylphenol polyethylene glycol ether (30 mol EO)	-	12%	4%
cyclohexanone	-	15%	20%
xylene mixture	65%	25%	20%

Mixing finely ground active ingredient and additives gives an emulsifiable concentrate which yields emulsions of the desired concentration on dilution with water.

Example F2: Solutions

	a)	b)	c)	d)
active ingredient	80%	10%	5%	95%
ethylene glycol monomethyl ether		20%	-	-
polyethylene glycol (MW 400)		-	70%	-
N-methylpyrrolid-2-one	20%	-	-	-
epoxidised coconut oil	-	-	-	1%
benzine (boiling range: 160-190°)	-	-	94%	-

Mixing finely ground active ingredient and additives gives a solution suitable for use in the form of microdrops.

Example F3: Granules

	a)	b)	c)	d)
active ingredient	5%	10%	8%	21%
kaolin	94%	-	79%	54%
highly dispersed silicic acid	1%	-	13%	7%
attapulgate	-	90%	-	18%

The active ingredient is dissolved in dichloromethane, the solution is sprayed onto the carrier mixture and the solvent is evaporated off *in vacuo*.

Example F4: Wettable powders

	a)	b)	c)
active ingredient	25%	50%	75%
sodium lignosulfonate	5%	5%	-
sodium lauryl sulfate	3%	-	5%
sodium diisobutyl naphthalenesulfonate	-	6%	10%
octylphenol polyethylene glycol ether (7-8 mol EO)	-	2%	-
highly dispersed silicic acid	5%	10%	10%
kaolin	62%	27%	-

Active ingredient and additives are mixed together and the mixture is ground in a suitable mill, yielding wettable powders that can be diluted with water to form suspensions of the desired concentration.

Example F5: Emulsifiable concentrate

active ingredient	10%
octylphenol polyethylene glycol ether (4-5 mol EO)	3%
calcium dodecylbenzenesulfonate	3%
castor oil polyethylene glycol ether (36 mol EO)	4%
cyclohexanone	30%
xylene mixture	50%

Mixing finely ground active ingredient and additives gives an emulsifiable concentrate which yields emulsions of the desired concentration on dilution with water.

Example F6: Extruder granules

active ingredient	10%
sodium lignosulfonate	2%
carboxymethylcellulose	1%
kaolin	87%

Active ingredient and additives are mixed together, the mixture is ground, moistened with water, extruded and granulated and the granules are dried in a stream of air.

Example F7: Coated granules

active ingredient	3%
polyethylene glycol (MW 200)	3%
kaolin	94%

Uniform application of the finely ground active ingredient to the kaolin moistened with polyethylene glycol in a mixer yields non-dusty coated granules.

Example F8: Suspension concentrate

active ingredient	40%
ethylene glycol	10%
nonylphenol polyethylene glycol ether (15 mol EO)	6%
sodium lignosulfonate	10%
carboxymethylcellulose	1%
aqueous formaldehyde solution (37%)	0.2%
aqueous silicone oil emulsion (75%)	0.8%
water	32%

Mixing finely ground active ingredient and additives gives a suspension concentrate which yields suspensions of the desired concentration on dilution with water.

Biological Examples:

Example B1: Action against *Spodoptera littoralis*

Young soybean plants are sprayed with an aqueous emulsion spray mixture comprising 12.5 ppm of test compound and, after the spray-coating has dried, the plants are populated with 10 caterpillars of *Spodoptera littoralis* in the first stage and then placed in a plastics container. 3 days later, the percentage reduction in population and the percentage reduction in feeding damage (% activity) are determined by comparing the number of dead caterpillars and the feeding damage on the treated plants with that on untreated plants.

The compounds of tables exhibit good activity in this test. Especially the compounds 1.5, 1.6, 2.6, 3.2, 3.5, 3.6, 3.8, 3.19, 4.8 and 4.18 exhibit an activity of over 80% in this test.

Example B2: Action against *Spodoptera littoralis*, systemic:

Maize seedlings are placed in the test solution. 6 days later, the leaves are cut off, placed on moist filter paper in a petri dish and infested with 12 to 15 *Spodoptera littoralis* larvae in the L₁ stage. 4 days later, the percentage reduction in population (% activity) is determined by comparing the number of dead caterpillars on treated plants with that on untreated plants.

The compounds of tables exhibit good activity in this test. Especially the compounds 2.6, 3.6, 3.19, 4.8 and 4.18 exhibit an activity of over 80% in this test.

Example B3: Action against *Heliothis virescens*

30-35 eggs of *Heliothis virescens*, from 0 to 24 hours old, are placed on filter paper in a petri dish on a layer of artificial nutrient. 0.8 ml of the test solution is then pipetted onto the filter paper. Evaluation is made 6 days later. The percentage reduction in population (% activity) is determined by comparing the number of dead eggs and larvae on treated plants with that on untreated plants. Especially the compounds 1.5, 1.6 and 4.8 exhibit an activity of over 80% in this test.

The compounds of tables exhibit good activity in this test.

Example B4: Action against *Plutella xylostella* caterpillars

Young cabbage plants are sprayed with an aqueous emulsion spray mixture comprising 12.5 ppm of test compound. After the spray-coating has dried, the cabbage plants are populated with 10 caterpillars of *Plutella xylostella* in the first stage and placed in a plastics container. Evaluation is made 3 days later. The percentage reduction in population and the percentage reduction in feeding damage (% activity) are determined by comparing the number of dead caterpillars and the feeding damage on the treated plants with that on the untreated plants.

The compounds of tables exhibit good activity in this test. Especially the compounds 2.5, 2.8, 4.5, 4.6 and 4.8 exhibit an activity of over 80% in this test.

Example B5: Action against *Diabrotica balteata*

Maize seedlings are sprayed with an aqueous emulsion spray mixture comprising 12.5 ppm of the test compound and, after the spray-coating has dried, the maize seedlings are populated with 10 *Diabrotica balteata* larvae in the second stage and then placed in a plastics container. 6 days later, the percentage reduction in population (% activity) is determined by comparing the number of dead larvae on the treated plants with that on untreated plants.

The compounds of tables exhibit good activity in this test. In particular, compounds 1.5, 1.6, 2.6 and 4.8 are more than 80 % effective.

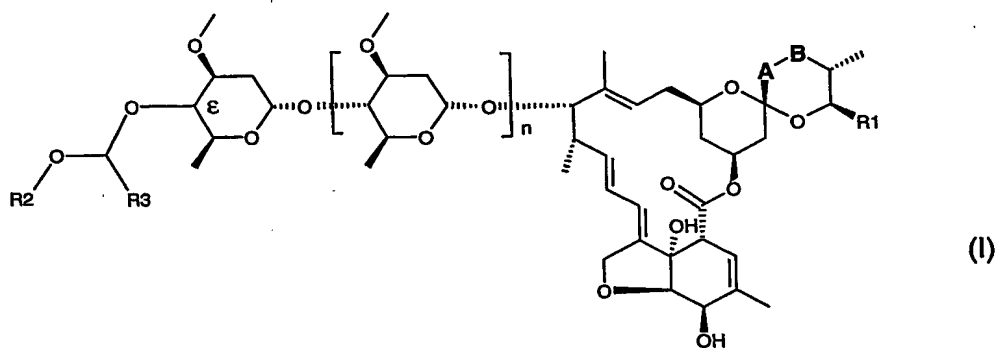
Example B6: Action against Tetranychus urticae

Young bean plants are populated with a mixed population of *Tetranychus urticae* and sprayed one day later with an aqueous emulsion spray mixture comprising 12.5 ppm of test compound. The plants are incubated for 6 days at 25°C and subsequently evaluated. The percentage reduction in population (% activity) is determined by comparing the number of dead eggs, larvae and adults on the treated plants with that on untreated plants.

The compounds of tables exhibit good activity in this test. In particular, compounds 1.5, 1.6, 2.6, 3.2, 3.5, 3.6, 3.8, 3.19, 4.8 and 4.18 are more than 80 % effective.

What is claimed is:

1. A compound of formula



wherein

n is 0 or 1;

A-B is $-\text{CH}=\text{CH}-$ or $-\text{CH}_2-\text{CH}_2-$;

R_1 is $\text{C}_1\text{-C}_{12}$ -alkyl, $\text{C}_3\text{-C}_8$ -cycloalkyl or $\text{C}_2\text{-C}_{12}$ -alkenyl;

R_2 is $\text{C}_1\text{-C}_{12}$ -alkyl, $\text{C}_2\text{-C}_{12}$ -alkenyl, $\text{C}_2\text{-C}_{12}$ -alkynyl; or $\text{C}_1\text{-C}_{12}$ -alkyl, $\text{C}_2\text{-C}_{12}$ -alkenyl or $\text{C}_2\text{-C}_{12}$ -alkynyl, which are substituted with one to five substituents selected from the group consisting of OH, halogen, CN, $-\text{N}_3$, $-\text{NO}_2$, $\text{C}_3\text{-C}_8$ -cycloalkyl which is optionally substituted with one to three $\text{C}_1\text{-C}_6$ -alkyl-groups, $\text{C}_3\text{-C}_8$ -cycloalkenyl which is optionally substituted with one to three $\text{C}_1\text{-C}_6$ -alkyl-groups, norbornylenyl-, $\text{C}_3\text{-C}_8$ -halocycloalkyl, $\text{C}_1\text{-C}_{12}$ -alkoxy, $\text{C}_1\text{-C}_6$ -alkoxy- $\text{C}_1\text{-C}_6$ -alkoxy, $\text{C}_3\text{-C}_8$ -cycloalkoxy, $\text{C}_1\text{-C}_{12}$ -haloalkoxy, $\text{C}_1\text{-C}_{12}$ -alkylthio, $\text{C}_3\text{-C}_8$ -cycloalkylthio, $\text{C}_1\text{-C}_{12}$ -haloalkylthio, $\text{C}_1\text{-C}_{12}$ -alkylsulfinyl, $\text{C}_3\text{-C}_8$ -cycloalkylsulfinyl, $\text{C}_1\text{-C}_{12}$ -haloalkylsulfinyl, $\text{C}_3\text{-C}_8$ -halocycloalkylsulfinyl, $\text{C}_1\text{-C}_{12}$ -alkylsulfonyl, $\text{C}_3\text{-C}_8$ -cycloalkylsulfonyl, $\text{C}_1\text{-C}_{12}$ -haloalkylsulfonyl, $\text{C}_3\text{-C}_8$ -halocycloalkylsulfonyl, $-\text{NR}_4\text{R}_6$, $-\text{X}-\text{C}(=\text{Y})-\text{R}_4$, $-\text{X}-\text{C}(=\text{Y})-\text{Z}-\text{R}_4$, $-\text{P}(=\text{O})(\text{OC}_1\text{-C}_6\text{-alkyl})_2$, aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy; wherein the aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy groups are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, Halogen, CN, NO_2 , $\text{C}_1\text{-C}_{12}$ -alkyl, $\text{C}_3\text{-C}_8$ -Cycloalkyl, $\text{C}_1\text{-C}_{12}$ -Haloalkyl, $\text{C}_1\text{-C}_{12}$ -alkoxy, $\text{C}_1\text{-C}_{12}$ -Haloalkoxy, $\text{C}_1\text{-C}_{12}$ -alkylthio, $\text{C}_1\text{-C}_{12}$ -haloalkylthio, $\text{C}_1\text{-C}_6$ -alkoxy- $\text{C}_1\text{-C}_6$ -alkyl, $\text{C}_2\text{-C}_8$ -alkenyl, $\text{C}_2\text{-C}_8$ -alkynyl, $\text{Si}(\text{C}_1\text{-C}_{12}\text{-alkyl})_3$, $-\text{X}-\text{C}(=\text{Y})-\text{R}_4$, $-\text{X}-\text{C}(=\text{Y})-\text{Z}-\text{R}_4$, aryl, aryloxy, heterocyclyl and heterocyclyloxy; or

R_2 is aryl, heterocyclyl $\text{C}_3\text{-C}_8$ -Cycloalkyl, $\text{C}_3\text{-C}_8$ -Cycloalkenyl; or aryl, heterocyclyl

C₃-C₈-Cycloalkyl or C₃-C₈-Cycloalkenyl, which are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, halogen, CN, NO₂, C₁-C₁₂-alkyl, C₃-C₈-cycloalkyl, C₁-C₁₂-haloalkyl, C₁-C₁₂-alkoxy, C₁-C₁₂-haloalkoxy, C₁-C₁₂-alkylthio, C₁-C₁₂-haloalkylthio, C₁-C₆-alkoxy-C₁-C₆-alkyl, dimethylamino-C₁-C₆-alkoxy, C₂-C₈-alkenyl, C₂-C₈-alkinyl, methylenedioxy, aryl, aryloxy, heterocyclyl and heterocyclyloxy;

R₃ is H, C₁-C₁₂-alkyl or C₁-C₁₂-alkyl which is substituted with one to five substituents selected from the group consisting of OH, halogen, CN, -N₃, -NO₂, C₃-C₈-Cycloalkyl which is optionally substituted with one to three C₁-C₆-alkyl groups, norbornylenyl-, C₃-C₈-Cycloalkenyl which is optionally substituted with one to three methyl groups; C₃-C₈-halocycloalkyl, C₁-C₁₂-alkoxy, C₁-C₆-alkoxy-C₁-C₆-alkoxy, C₃-C₈-cycloalkoxy, C₁-C₁₂-haloalkoxy, C₁-C₁₂-alkylthio, C₃-C₈-cycloalkylthio, C₁-C₁₂-haloalkylthio, C₁-C₁₂-alkylsulfinyl, C₃-C₈-cycloalkylsulfinyl, C₁-C₁₂-haloalkylsulfinyl, C₃-C₈-halocycloalkylsulfinyl, C₁-C₁₂-alkylsulfonyl, C₃-C₈-cycloalkylsulfonyl, C₁-C₁₂-haloalkylsulfonyl, C₃-C₈-halocycloalkylsulfonyl, -NR₄R₆, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, -P(=O)(OC₁-C₆-alkyl)₂, aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy; wherein the aryl, heterocyclyl, aryloxy, arylthio and heterocyclyloxy groups are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, Halogen, CN, NO₂, C₁-C₁₂-alkyl, C₃-C₈-Cycloalkyl, C₁-C₁₂-Haloalkyl, C₁-C₁₂-alkoxy, C₁-C₁₂-Haloalkoxy, C₁-C₁₂-alkylthio, C₁-C₁₂-haloalkylthio, C₁-C₆-alkoxy-C₁-C₆-alkyl, C₂-C₈-alkenyl, C₂-C₈-alkinyl, Si(C₁-C₁₂-alkyl)₃, -X-C(=Y)-R₄, -X-C(=Y)-Z-R₄, aryl, aryloxy, heterocyclyl and heterocyclyloxy; or

R₂ and R₂ and R₃ together are a three- to seven-membered alkylen- or a four- to seven-membered alkenylenbridge, wherein one or two CH₂-groups may independently of each other be substituted by a group -C(=O)-, -C(=S)-, O, S, -NR₅, -OC(=O)-O-, -OC(=O)S-, -OC(=O)N(R₅)-, -C(=O)O-, -C(=O)S-, -C(=O)N(R₅)-, -N(R₅)C(=O)S-, -N(R₅)C(=O)N(R₅)-, and wherein the alkylene or alkenylenbridge may be independently of each other substituted with one or two substituents selected from the group consisting of C₁-C₄-alkyl, C₁-C₄-alkoxy and C₁-C₄-halogenalkyl;

X is O, NR₅ or a bond;

Y is O or S;

Z is O, S or NR₅

R_4 is H, C_1 - C_{12} -alkyl which is optionally substituted with one to five substituents selected from the group consisting of halogen, hydroxy, C_1 - C_6 -alkoxy and CN; C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl, heterocyclyl- C_1 - C_{12} -alkyl; or aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl or heterocyclyl- C_1 - C_{12} -alkyl, which are – depending on the substitution possibilities – optionally substituted in the ring with one to five substituents selected from the group consisting of halogen, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkyl and C_1 - C_6 -haloalkoxy;

R_5 is H, C_1 - C_8 -alkyl, C_3 - C_8 -cycloalkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, benzyl or $-C(=O)$ - C_1 - C_{12} -alkyl;

R_6 is H, C_1 - C_{12} -alkyl which is optionally substituted with halogen, C_1 - C_6 -alkoxy, CN, C_2 - C_8 -alkenyl, C_2 - C_8 -haloalkenyl, C_2 - C_8 -alkinyl, C_1 - C_{12} -Haloalkenyl, $-X-C(=Y)-R_9$, $-X-C(=Y)-Z-R_9$, $-SO_2-R_9$, aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl, heterocyclyl- C_1 - C_{12} -alkyl; or aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl or heterocyclyl- C_1 - C_{12} -alkyl, which are – depending on the substitution possibilities – optionally substituted in the ring with one to five substituents selected from the group consisting of halogen, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkyl or C_1 - C_6 -haloalkoxy; or

R_4 and R_6 together are a three- to five membered alkylene bridge, wherein one of the methylene groups may be replaced by O, S or SO_2 ; and

R_9 is H, C_1 - C_{12} -alkyl which is optionally substituted with one to five substituents selected from the group consisting of halogen, hydroxy, C_1 - C_6 -alkoxy and CN; C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl, heterocyclyl- C_1 - C_{12} -alkyl; or aryl, heterocyclyl, aryl- C_1 - C_{12} -alkyl or heterocyclyl- C_1 - C_{12} -alkyl, which are – depending on the substitution possibilities – optionally substituted in the ring with one to five substituents selected from the group consisting of halogen, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkyl and C_1 - C_6 -haloalkoxy;

and, where applicable, to E/Z isomers, mixtures of E/Z isomers and/or tautomers, in each case in free form or in salt form.

2. A compound according to claim 1 of the formula (I) in the free form.
3. A compound according to any one of claims 1 or 2 of the formula (I), wherein wherein R_3 is methyl.
4. A compound according to any one of claims 1 or 2 of the formula (I), wherein

wherein R_3 is C_3 - C_8 -alkyl.

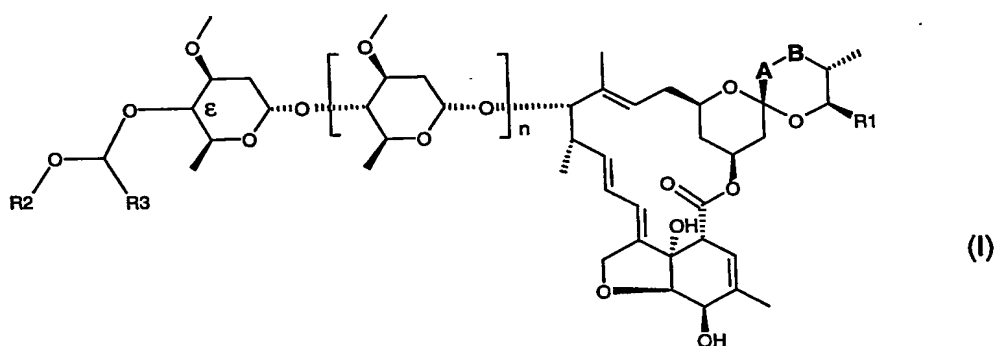
5. A compound according to any one of claims 1 or 2 of the formula (I), wherein wherein R_3 is C_1 - C_8 -alkyl which is substituted with one to five substituents selected from the group consisting of OH, halogen, CN, $-N_3$, $-NO_2$, C_3 - C_8 -cycloalkyl which is optionally substituted with one to three C_1 - C_6 -alkyl groups, norbornylenyl-, C_3 - C_8 -Cycloalkenyl which is optionally substituted with one to three methyl groups; C_3 - C_8 -halocycloalkyl, C_3 - C_8 -cycloalkoxy, C_1 - C_{12} -haloalkoxy, C_1 - C_{12} -alkylthio, aryl, heterocyclyl, arylthio or heterocyclyloxy; wherein the aryl, heterocyclyl, arylthio and heterocyclyloxy groups are optionally – depending on the substitution possibilities on the ring – substituted with one to five substituents selected from the group consisting of OH, Halogen, CN, NO_2 , C_1 - C_{12} -alkyl, C_3 - C_8 -cycloalkyl, C_1 - C_{12} -haloalkyl, C_1 - C_{12} -alkoxy, C_1 - C_{12} -haloalkoxy, C_1 - C_{12} -alkylthio, C_1 - C_{12} -haloalkylthio, C_1 - C_6 -alkoxy- C_1 - C_6 -alkyl, C_2 - C_8 -alkenyl, C_2 - C_8 -alkinyl, $Si(C_1$ - C_{12} -alkyl) $_3$, $-X-C(=Y)-R_4$, $-X-C(=Y)-Z-R_4$, aryl, aryloxy, heterocyclyl and heterocyclyloxy.

6. A pesticide which contains at least one compound of the formula (I) as described in claim 1 as active compound and at least one auxiliary.

7. A method for controlling pests wherein a composition as described in claim 6 is applied to the pests or their habitat.

Abstract

What is described are a compound of the formula



wherein

n is 0 or 1; A-B is $-\text{CH}=\text{CH}-$ or $-\text{CH}_2-\text{CH}_2-$;

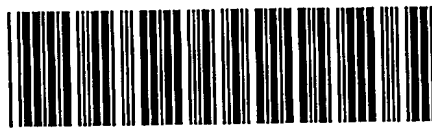
R_1 is $\text{C}_1\text{-C}_{12}$ -alkyl, $\text{C}_3\text{-C}_8$ -cycloalkyl or $\text{C}_2\text{-C}_{12}$ -alkenyl;

R_2 is for example $\text{C}_1\text{-C}_{12}$ -alkyl, $\text{C}_2\text{-C}_{12}$ -alkenyl or $\text{C}_2\text{-C}_{12}$ -alkinyl; which are optionally substituted with one to five substituents selected from the group consisting of OH, halogen, CN, $-\text{N}_3$, $-\text{NO}_2$, $\text{C}_3\text{-C}_8$ -Cycloalkyl, norbornylenyl-, $\text{C}_3\text{-C}_8$ -Cycloalkenyl; $\text{C}_3\text{-C}_8$ -halocycloalkyl, $\text{C}_1\text{-C}_{12}$ -alkoxy, $\text{C}_1\text{-C}_6$ -alkoxy- $\text{C}_1\text{-C}_6$ -alkoxy, $\text{C}_3\text{-C}_8$ -cycloalkoxy, $\text{C}_1\text{-C}_{12}$ -haloalkoxy, $\text{C}_1\text{-C}_{12}$ -alkylthio, $\text{C}_3\text{-C}_8$ -cycloalkylthio, $\text{C}_1\text{-C}_{12}$ -haloalkylthio, $\text{C}_1\text{-C}_{12}$ -alkylsulfinyl, $\text{C}_3\text{-C}_8$ -cycloalkylsulfinyl, $\text{C}_1\text{-C}_{12}$ -haloalkylsulfinyl, $\text{C}_3\text{-C}_8$ -halocycloalkylsulfinyl, $\text{C}_1\text{-C}_{12}$ -alkylsulfonyl, $\text{C}_3\text{-C}_8$ -cycloalkylsulfonyl, $\text{C}_1\text{-C}_{12}$ -haloalkylsulfonyl, $\text{C}_3\text{-C}_8$ -halocycloalkylsulfonyl, $-\text{NR}_4\text{R}_6$, $-\text{X}-\text{C}(=\text{Y})-\text{R}_4$, $-\text{X}-\text{C}(=\text{Y})-\text{Z}-\text{R}_4$, $-\text{P}(=\text{O})(\text{OC}_1\text{-C}_6\text{-alkyl})_2$, aryl, heterocyclyl, aryloxy, arylthio and heterocycloxy;

R_3 is for example H, $\text{C}_1\text{-C}_{12}$ -alkyl or $\text{C}_1\text{-C}_{12}$ -alkyl which is optionally substituted and, where applicable, to E/Z isomers, mixtures of E/Z isomers and/or tautomers, in each case in free form or in salt form;

a process for preparing and using these compounds and their tautomers; pesticides whose active compound is selected from these compounds and their tautomers; and a process for preparing these compounds and compositions, and the use of these compounds and compositions.

PCT Application
PCT/EP2003/014613



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